STATE-TRAIT LEARNED HELPLESSNESS

AN INVESTIGATION INTO THE INTERACTION BETWEEN LOCUS OF CONTROL AND LEARNED HELPLESSNESS AND THE CROSS-SITUATIONAL GENERALIZATION OF INTERFERENCE EFFECTS.

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by

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ABSTRACT

Two weaknesses are particularly evident in the now extensive learned helplessness (LH) literature. The first is the lack of fit between operational definitions and the predicted results. The second is the inability of the theory to specify the extent to which the effect should generalize, and a lack of empirical studies to delineate such boundaries. In the recent human literature, these criticisms assume even greater significance. By definition, LH involves the generalization of an expectancy of uncontrollability from one situation to another, separate situation. Because the vast majority of human studies have conducted the post test within the context of the same experimental situation as the pretreatment, the question arises not only to whether generalization has been demonstrated but whether interference itself has been demonstrated. In an attempt to improve the fit between theory and behavioural outcome, a State-Trait (S-T) Helplessness model was developed, incorporating locus of control and elements from Social Learning Theory, Reactance Theory, and Attribution Theory, in addition to the original LH formulation.

An experiment was conducted to test a part of this theoretical framework. Three groups, equally divided between internals and externals and counterbalanced for sex were exposed to escapable noise, inescapable noise, or no noise. They were then tested on a series of 20 patterned anagrams. Subjective stress self-ratings and peripheral pulse volume and heart rate were the other major dependent variables. In addition to a replication of cross modal interference in man, more complex relations between sex and locus of control were found, indicating that these two trait variables partly determinedwhether or not interference and mastery effects were found. Increased subjective stress accompanied interference effects on the anagrams. The physiological results were complex, interacting with locus of control and suggesting the presence of both activation and deactivation among internal subjects on one measure.

A second group received identical pretreatment to the inescapable group already described. But, unlike the first, it received the post treatment phase as part of a separate experiment, conducted by a different experimenter. Anagram performance was similar to that found in the other inescapable group. Subjective stress ratings were slightly lower. These findings indicate not only that generalization occurs but suggests that previous human experiments may have obtained similar results, irrespective of whether the post treatment tests were presented as a part of the same experiment or as a separate experiment. They also raise the possibility of different generalization gradients existing for the different interference components.

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Special thanks goes to my supervisor, Dr H. Priest, for allowing me enough rope to move in my own direction, yet not so much that I became irrevocably tangled.

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OVERVIEW

The Broad Perspective

Overmier and Seligman (1967) found that dogs that were exposed to inescapable and unavoidable electric shocks later failed to escape shock in a different situation where escape was possible. It was further demonstrated that this effect was caused by the uncontrollability of the original shocks rather than by the shocks per se (Seligman and Maier, 1967).

Seligman and his associates (Overmier & Seligman, 1967; Seligman, Maier, & Geer, 1968; Maier, Seligman, & Solomon, 1969; Seligman & Groves, 1970; Seligman, Roselli, & Kozak, 1975) have used the term "learned helplessness" both to describe the phenomenon of interference with adaptive responding and as a shorthand label for the mechanism which they think underlies and explains the interference. The "learned helplessness hypothesis" argues that when events are uncontrollable, the organism learns that its behaviour and outcomes are independent, and that this learning or cognition produces the motivational, cognitive, and emotional effects that are claimed to accompany uncontrollability.

An additional development has been the assertion that learned helplessness (LH) is a laboratory model for naturally occuring depression in man (Seligman; 1972, 1973, 1975a, 1975b, 1976).

Whatever the current or ultimate shortcomings of this formulation, it has had considerable merit as a heuristic device, pioneering new areas of investigation and stimulating a considerable amount of research over a wide variety of issues. Simultaneously, current infrahuman S-R models of learning and dynamic clinical models of human depression have been challenged on both theoretical and empirical grounds. Levis (1976), in a critical account of the learned helplessness position, makes the comment:

> By pitting cognitive theory against S-R positions, ingenious experimentation has emerged on both sides of the issue. The resulting sharpening of theoretical issues may eventually revive the interest and the advancement of knowledge achieved during the Hull-Spence and Tolman debates which dominated psychological thinking in the forties and fifties. (p. 47)

Recent reviewers of the depression literature have commented upon the lack of involvement in this field by experimental and behavioural psychologists (Becker, 1974; Friedman & Katz, 1974). In the preface to his review, Becker states:

> Until quite recently, most of the literature on depression was provided by psychodynamically or biologically oriented investigators. The psychodynamic studies have yielded a rich crop of clinical observations and generated abundant theoretical speculation. But these speculations have stimulated few systematic investigations. The paucity of alternative psychosocial formulations is somewhat dismaying.

This neglect was in spite of the high prevalence and seriousness of this disorder in contemporary society and the general view that the majority of clinical depressions have a psychogenic origin.

In asserting that LH is a model for reactive depression, Seligman has provided an animal analogue which has allowed experimental manipulation to supplement the more traditional naturalistic observational approaches. Although the equivalence of these two phenomena is far from firmly established, the hypothesis has been instrumental in generating a great deal of research in a previously neglected area.

It is largely this work, along with the Primate separation studies[1], that has recently been linked with neurobiological research to provide a very important infusion into this clinical field. These experimental approaches have produced a conceptual sharpening and a build up of a data base upon which more adequate theory building and rational treatment programmes have grown. This development has led to a very rapid growth in the understanding of depression and has led Akiskal and McKinney (1975) to comment:

> The progress made in the general area of affective disorders during the last decade is probably unmatched by that of any other area of psychiatric research. (p. 285)

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1. For a review of the Primate work related to depression, see Harlow & Soumi, 1974.

Although there is a great deal that is still confused in this field, it is now a major growth area of clinical research. This is in marked contrast to the situation less than ten years ago.

Major Directions of Learned Helplessness Research

As indicated in the preceding section, learned helplessness theory has generated a great deal of research and novel ideas that have had a strong influence on somewhat diverse areas of psychological enquiry.

Initially, the research was directed toward demonstrating the effect in a wide variety of animal species and towards a fuller description of the phenomenon. However, the blatantly cognitive nature of the LH position quickly drew attack from S-R theorists. Both they and the physiologically oriented researchers proposed a variety of alternative explanations for the effect. Increasingly, research became organized around the thrust and counterthrust of opposing theorists. This is currently a very active and somewhat confused area although this year, in particular, has found some of the clouds starting to clear.

With the proposal that LH is an appropriate analogue for reactive depression came another major direction for research. Experimentation has focussed on delineating parallels between the two phenomena. The wider implications of this and the other major body of helplessness literature have been indicated in the previous section.

In 1971, a new direction was initiated with the first attempts to demonstrate learned helplessness in human subjects (Fosco & Geer, 1971; Thornton & Jacobs, 1971). Two principal research strategies have subsequently been followed in the study of helplessness in humans. The first has used the LH paradigm typically employed in the animal work to replicate the animal findings in man. The second has extended the search for parallels between LH and depression by looking for the behavioural symptoms of LH in depressed subjects.

Here, in contrast to the situation in the animal realm, the cognitive nature of the theory has not been seriously challenged. Indeed, it finds its strongest support in the rapidly growing human literature. However, as will be discussed in chapter three, the research findings have been sufficiently inconsistent to suggest that the theory has some other deficiencies.

EARLY EXPERIMENTS

In the course of experimentation into relationships between Pavlovian conditioning and instrumental behaviour, Overmier and Seligman (1967) made what was to them a striking discovery. They were investigating aspects of the hypothesis that Pavlovian conditioned responses (CRs) mediate or motivate instrumental behaviour. Specifically, they were concerned with demonstrating that a conditioned stimulus (CS), paired with shock in a Pavlovian conditioning session, would when subsequently presented in a different context, energize instrumental behaviour which is motivated by fear. Earlier work, including their own studies, provides strong support for this postulate[1].

The great majority of studies reviewed involved imposing CSs on already established instrumental avoidance responses. That is to say, the subject was first trained to avoid. Then the Pavlovian conditioning was carried out and followed by a further session of escape-avoidance trials. As indicated, the Pavlovian fear conditioning consistently had incremental effects on the already learned avoidance responding.

The Overmier and Seligman (1967) experiment with mongrel dogs differed from these experiments in that the Pavlovian phase was carried out <u>before</u> any avoidance training. In these and subsequent experiments with dogs, it was found that contrary to the previous increment in avoidance responding, these subjects typically failed to both escape and avoid shock when placed in a situation

1. See Maier, Seligman, & Solomon, 1969 for a review of both the Pavlovian fear conditioning literature and the early LH dog experimentation.

where escape was possible.

An account of the experimental procedure typically used to produce this impairment is given by Maier et al (1969):

> On the first day, the subject is strapped into the Pavlov harness and given 64 inescapable shocks, each 5.0 seconds long and of 6.0-ma. intensity. The shocks occur randomly in time. Twenty-four hours later, the subject is given 10 trials of signalized escape-avoidance training in the shuttle box. The onset of the CS (dimmed illumination) begins each trial, and the CS remains until the subject jumps the barrier. If the subject fails to jump the barrier within 60 seconds after CS onset, the trial automatically terminates, and a 60-second latency is recorded. (p. 320)

Failure to escape and avoid the shock in the shuttlebox over 9 or more of the 10 trials was found in 63 percent of the 82 dogs pretreated with inescapable shocks in the early experiments. This was characteristic of only 6 percent of the 35 naive subjects. Another curious feature of many of those animals that failed to escape was that when they did occasionally jump the barrier and escape or avoid, they typically reverted to taking the shock again on subsequent trials. This was in marked contrast to those dogs that had not received pretreatment. For them, a successful escape response reliably predicted future, short-latency escape responses.

Another finding of these early dog studies was that the interference effect was consistently produced when variations were made in the frequency, intensity, density, duration, and temporal pattern of the inescapable shocks (Overmier & Seligman, 1967; Seligman & Maier, 1967).

In the Overmier and Seligman article just cited, four further major findings are reported. (1) The presence or absence of the CS signal made no difference. (2) The effect occurred even when the intensity of the shock was increased during the escape-avoidance training. (3) It occurred when motor responses during the initial inescapable shock training were blocked with curare. (4) The LH effect dissipated with time (48 hours) if it was not maintained by an intervening failure to escape shocks.

Two final major discoveries were made in this early series of dog experiments. The first by Seligman, Maier, and Geer (1968), demonstrated that repeatedly forcing the subject to make the instrumental response that terminated the shock, broke through the helplessness effect and allowed the subject to engage in escape responding. The second by Seligman and Maier (1967) indicated that the escape-avoidance deficit was not produced by escapable shock. The experiment in which this was demonstrated will be outlined in some detail because, as will shortly be discussed, it provides a test of the mechanism that Seligman and his coworkers have proposed to account for the interference effect. Even more important is the fact that it has become the experimental paradigm that has been extensively used to demonstrate the helplessness effect in other species, including the majority of the human studies. It is now commonly referred to as the triadic design (Maier & Seligman, 1976).

In this experiment three groups were used. Each comprised eight dogs. In an escape group, each dog was trained in a hammock to press a panel with its nose or head to turn off shock. A yoked group received shocks identical in number, duration, and pattern to the shocks delivered to the escape group. The yoked group differed from the escape group only with respect to the degree of instrumental control over shock. Panel pressing did not influence the programmed shocks in the yoked group. A naive control group received no shock in the hammock.

Seligman and Maier noted that during their time in the hammock, the behaviour of the escape group differed markedly from that of the yoked group. The former group quickly learned to stop the shock and evidenced decreasing panel pressing latencies over the course of the session. In contrast to this, the yoked group subjects typically lay motionless after about 30 trials.

Twenty-four hours following hammock treatment, the dogs all received escape/avoidance training in a shuttle box. This was described earlier. The results were consistent with those already outlined for these early dog experiments. In this particular case, six of the eight subjects in the yoked group failed to escape. The escape group did not differ from the naive control group and in marked contrast to the yoked experimental group, these two groups performed well in the shuttle box.

THE CONCEPT OF LEARNED HELPLESSNESS

The term first appeared as learned "helplessness" in the Overmeir and Seligman (1967) paper describing the early dog experiments. The "helplessness" part seems to derive from a somewhat anthropocentric conception of the experimental dogs' behaviour in both the harness and the shuttle box, whereas the learned part derives from the proposal that the failure of the dogs to escape in the shuttle box following prior exposure to inescapable shock is a type of learning.

Given this origin of the concept, it is not surprising to find it has subsequently been used as both a description of the interference phenomenon previously described and as a label for the process hypothesized to produce this effect.[1] As a process it was first defined as "....the learning (or perception) of independence between the presentation and/or withdrawal of aversive events" (Seligman, Maier, & Geer, 1968, p 259). Again it is commented, "....learned helplessness is a convenient label for the expectational and incentive mechanisms we have described" (Maier,

1. The writer is indebted to an unpublished manuscript by Marshall (1975) for first alerting him to the dual usage of the term.

Seligman, & Solomon, 1969, p 327). These definitions refer to hypothetical constructs - not observations.

Although it was initially stated that the term was not referring to a description of the organism's behaviour (Seligman et al, 1968, p 259) it has increasingly been used as if it were referring to something objective and observable. Reference is made to the "alleviation of learned helplessness" (Seligman et al, 1968), "the phenomenon of learned helplessness" (Seligman, 1975a, p 48), and the "LH effect" (Maier & Seligman, 1976). A recent definition reflects this tendency to regard LH as an observable outcome, namely - "learned helplessness is defined as an effect resulting from the uncontrollablity of aversive events" (Maier & Seligman, 1976, p 33).

This change in usage of the term appears to reflect an increase in the confidence of Seligman and his coworkers in the reality or validity of their theoretical explanation. Even if the evidence did point to this, the use of the term as both a description and an hypothesis would still be confusing as it is often not clear in what sense it is being invoked. This very usage has probably also contributed to the tendency to regard theory as reality. As it happens, there is now evidence that some of the phenomena included under the rubric of learned helplessness are mediated by short-term biochemical depletions (Glazer & Weiss; 1976a, 1976b). As such, they are not learned in the usual sense. Consequently, the use of the term learned helplessness may be a misnomer.

For the above reasons, it would be preferable to use separate terms for the two levels. From this point on, learned helplessness will be used to refer to mechanisms hypothesized to account for the behavioural deficits. The deficits will be embraced by the term that was favoured in the earlier literature, the interference effect. This term is currently used by Weiss in his writings and has the advantage of being neutral - it does not carry with it an implied causation.

Associated with an elaboration of helplessness theory, the term learned helplessness has been further broadened to include both positive and negative outcomes. From the most recent statement of Maier and Seligman (1976) and Seligman's (1975b) more extensive volume, LH appears to be defined as a decrement in the aquisition of an instrumental behaviour by a given subject following exposure to a paradigm which programmes reinforcers independently of the subject's responding.

There is considerable inconsistency in the deployment of the term however. For instance, although both the recent review articles just cited accept experiments where positive reinforcements were employed as instances of learned helplessness, at one point it is stated: "The LH hypothesis does not argue that failure to learn to escape shock results from exposure to sheer uncontrollability, but by exposure to uncontrollable <u>aversive</u> events" (Maier & Seligman, 1976, p 33). Note that this emphasis was the authors'. At another point in this article they change tack again and say that in order to demonstrate the LH effect, the uncontrollability of the events during the pretreatment must be demonstrated by the use of the triadic design (p 22). They cite instances however, where this was not employed, as examples of learned helplessness.

One further point is that even when the most stringent methods are used in an attempt to produce the interference effect, namely pretreatment with inescapable aversive stimuli embedded in a triadic design, the correlation between this manipulation and the resulting interference effect is not necessarily high. At various points Maier and Seligman (1976) have added further conditions in an attempt to increase the correspondence. See Levis (1976), pp 47-52, for an elaborate and critical account of these additions. The major problem is that they have not been built into an operational definition of LH. The consequent looseness between antecedents and consequents has left the way open for these additional factors to be invoked post hoc in determining whether or not a particular outcome is or is not an instance of "LH".

From this account, it is clear that the concept of learned helplessness lacks both consistency of usage and definitional precision. This is to be born in mind throughout the literature reviews and following discussions.

Although it may be that the very looseness of the formulation has been an important factor in generating such a large and rapid research thrust from a variety of directions, adequate scientific theory requires greater precision. Levis's (1976) citing of Feigl (1953) is pertinent:

> This obvious standard of scientific method requires that the concepts used in the formulation of scientific knowledge-claims be as definitely defined as possible. On the level of quantitative-classificatory sciences this amounts to the attempt to reduce all border-zone vagueness to a minimum. On the level of quantitative science the exactitude of the concepts is enormously enhanced through the application of the techniques of measurement. (p 12)

Clearly, learned helplessness has some way to go.

LEARNED HELPLESSNESS THEORY

The theory built from the data base of the early dog experiments is claimed by its authors to account for the major effects of these experimental manipulations, to be testable, and to be applicable outside of the laboratory (Seligman et al, 1971; Seligman, 1975; Maier & Seligman, 1976). The fecundity of this formulation is apparent from the above reviews of the now extensive experimental literature. Some extensions have been made but the basic theoretical framework remains unaltered.

The assumption underlying the theory is that animals can form expectations or cognitions about the outcomes of their acts. More specifically, learned helplessness theory claims that animals form cognitive representations of environmental contingencies and that these representations influence future responding. For example, in explaining why inescapable dogs failed to escape in a new situation where escape was possible, Seligman states, "I believe they learned that responding was futile and therefore expected future responding to shock to be futile" (Seligman, 1975b, p 47). This aspect of LH theory will be expanded later in this section.

LH theory argues that not only do organisms learn (form cognitive representations) that their responses produce reinforcement or no reinforcement (extinction), or that not responding produces reinforcement (differential reinforcement of other behaviour, DRO) but that they can learn about both these major dimensions at the same time. A consideration of Figure 1 will clarify this.

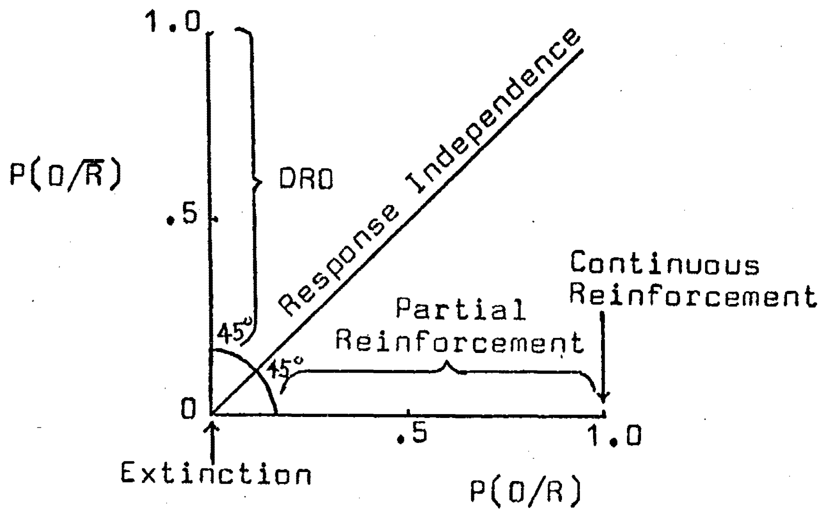

FIGURE 1 The Response Contingency Space
(Modified slightly from Seligman, 1975b, p 17)

The X axis labeled P(O/R) refers to the probability of an outcome following a response. This is the dimension that has traditionally been of concern to learning theorists. At 0, the probability of reinforcement following a given response is zero. This is an extinction schedule. At 1.0 we have continuous reinforcement. Between these two are the partial reinforcement schedules.

The Y axis refers to the conditional probability of an outcome occurring in the absence of a given response ($P(O/\overline{R})$). Similarly, the probabilities range from 0 to 1.0. The area defined by these two dimensions considered conjointly is referred to as the response contingency space. An example of how this relates to the programming of reinforcements will help to understand the meaning of this space. Consider the point .8, .5 on Figure 1. Here a subject will be reinforced eighty percent of the time it makes a given response. However, if it fails to make the response, it is nevertheless reinforced fifty percent of the time.

It is claimed that organisms can learn about both of these dimensions at the same time and that systematic changes in behaviour should occur with systematic changes along both dimensions. Clearly this is a more complex view of animal learning than that characteristic of most learning theorists (eg. Ferster & Skinner, 1957; Honig, 1966). However, it is a position that both opinion and evidence is increasingly supporting (e.g.,Catania, 1971; Church, 1969; Rescorla, 1967, 1968; Wagner, 1969; Weiss, 1968).

From the point of view of LH theory, the 45° line is considered to be of major significance. Along this line, the probability of an outcome is the same whether or not a given response occurs. When this occurs, Seligman (1975b) claims that the outcome can be said to be <u>independent</u> of that response and that when this is true of all an animal's voluntary responding (as is the case of the dogs receiving inescapable shocks in a Pavlovian hamock) then the outcome is <u>uncontrollable</u>.

The central postulate of LH theory is that when an organism is exposed to an uncontrollable environmental contingency, this experience is processed and transformed into a cognitive representation of the contingency. This representation is termed "the expectation that responding and outcome are independent" and it is stressed in the theoretical writings that this expectation is the causal condition for the interference effect (see e.g. Maier & Seligman, 1976, p 18).

It is proposed that this expectation generalizes from the uncontrollable situation (eg. Pavlovian harness) to a situation where control is possible (e.g. shuttle box). Interference is held to occur in the new situation for two reasons.

1. Incentive to initiate voluntary responding (eg. barrier jump, lever press) to control an outcome (eg. shock termination) is postulated to derive in part from the expectation that responding produces that outcome. When this expectation is absent, the incentive for response initiation is low. This accounts for what Seligman (1975b) terms the motivational deficit, inferred from the dogs' low rates of escape responding.
2. Prior learning of independence between responding and outcomes is hypothesized to interfere with learning that there is a change in contingency. This is termed the cognitive deficit and is claimed to be evident in those experimental dogs that made one or two successful escape responses and then reverted to failure on subsequent trials.

From these considerations, it is clear that shock per se should not produce the interference deficit. It is the subject's lack of control over it that is considered crucial. This is why the triadic design, with its capacity to separate the effects of shock from the effects of controllability, is considered to be central to experimentation in this area.[1]

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1. Church (1964) has argued against the use of yoked controls in instrumental learning experiments. Seligman (1975b, pp 190-191) claims that this argument is not relevant to the LH experiments because they use the yoked group as the experimental group instead of the conventional reversed procedure where the yoked group is the control. Levis (1976) has argued that the distinction is without substance and that Church's criticism is relevant. Ie. there is the possibility that individual differences in subject variables could produce a constant error, systematically biasing one group against the other rather than producing a random error.

Seligman and Johnson (1973) and Seligman (1975b) have extended this theory to changes in emotionality. Unlike other parts of LH theory it appears to be more consistently linked to uncontrollable aversive outcomes. They argue that the first occurrence of a traumatic event elicits a heightened state of emotionality ("fear"). Fear continues until the subject can or cannot control the trauma. If he can, fear is reduced and may disappear. If the subject learns that he cannot, fear is claimed to decrease and become replaced with depression.

There seems to be some confusion about the importance of this addition to Maier and Seligmans' theory. For example, when discussing stress in relation to inescapable shock, they refer to weight loss, ulcer development, and plasma steroid levels (Maier & Seligman, 1976, p 15). Although they refer to these in connection with Weiss's studies (op. cit.,p 29), they seldom mention stress or emotionality when referring to their own work. Indeed, on occasion they appear to deny them, eg. "....it is required that Weiss and his colleagues demonstrate that our inescapable shock conditions produce intense stress and norepinephrine depletion" (op. cit.,p 31). Additionally, in the animal work, there is no way of separating the construct of depression from the motivational and cognitive constructs at a behavioural level.

From these considerations, it is evident that more precision is required in linking these emotional components to other parts of LH theory. Seligman and Johnston (1973) attempt this, but the whole issue is still rather confused.

In addition to the critical comments already made in the course of outlining LH theory, a number of further criticisms have been levelled at it. Two that Maier and Seligman (1976) acknowledge are its vagueness in specifying boundary conditions (e.g. what behaviours should the effect generalize to) and the lack of precision in specifying the conditions under which the perception of independence develops.

This second weakness is partly a consequence of the lack of conceptual consistency discussed earlier and is also related to the heavy reliance of LH theory on the postulation of unobservable mediational processes. This characteristic of the theory has been attacked by S-R theorists (eg. Tyron, 1976; Levis, 1976).

There is no doubt that more sustained efforts will have to be made to link antecedent conditions more closely to the mediating constructs and behavioural outcomes. If not, the extensive criticisms produced by philosophers of science in response to Tolman's (1932) cognitive theory (e.g. Osgood, 1953) will be applicable to LH theory. It strikes the writer that the breadth of antecedents subsumed under the definition of uncontrollability is too wide. The 45° line (ref. Figure 1) includes uncontrollable positive reinforcement[1], uncontrollable aversive outcomes, and extinction (at point O).

Although this juxtapositioning is of considerable theoretical interest, it would seem that the behavioural concommitants of each of these environmental manipulations are too diverse for predictive purposes.[2] That this is at least intuitively recognized by Seligman and his coworkers is reflected in their persistent switching of definitions of learned helplessness. However, as indicated in the dog experiments, even when their tightest definition of antecedents is employed, the interference effect is still obtained in about only two-thirds of the animals. Consequently, the S-R "theorist" Tyrom's comment is not very helpful - namely: "The most likely hypothesis to explain these phenomena, and the most obvious one, is that the environmental conditions which define this conditioning paradigm are the ones responsible for causing the observed behaviour" (Tyron, 1976, p 513).

Recent work (Weiss, 1976a, 1976b) indicates that it is necessary to specify both intensity and duration

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1. Positive reinforcement is defined by its effect of increasing the frequency of behaviour it follows. This does not occur, according to LH theory, in the production of the interference effect. For the purist, to talk of positive reinforcement in this context is untenable.

2. Noncontingent 'reward' conditioning, for example, can lead to superstitious responding, although it has been argued that this is an atypical outcome of this contingency and may in fact represent involuntary responding (ref. Staddon & Simmelhag, 1971). Extinction generally leads to a more transient effect (Klinger, 1974, 1975).

parameters of shock to obtain a learned interference effect as opposed to one based on neurotransmitter depletion. Thus it appears that stimulus antecedents which are additional to uncontrollablity will have to be specified.

Although increased refinement in the specification of immediate environmental precipitants will be important in increasing the predictive capacity of LH formulations, it should be noted that a preoccupation with this enterprize characteristically leads to an exclusion of organismic variables (see Bowers, 1973 for a discussion of this assertion along both philosophical and empirical grounds). In this context it should be recalled that Maier and Seligman (1967) originally invoked differences in past experience to account for the variation in the dogs' reactions to uncontrollable shock.

It is recognized that there are difficulties in measuring trait variables in animal species. However, at the human level there exists a well established psychometric tradition of trait psychology. It is later argued that in considering learned helplessness in man, a great deal is to be gained by formally including trait variables within LH formulations and focussing upon how they interact with situational variables to produce the interference effect. At this level, it is considered that the cognitive nature of LH theory is of particular value in facilitating the linkage between current environmental contingencies and past experience.

LEARNED HELPLESSNESS AND DEPRESSION

The clinical field of depression has been characterized by a great deal of conceptual confusion and loose, primarily psychodynamic theorizing.[1] Recently the position has changed somewhat and an infusion into the field by more rigorous experimentalists from the biological, pharmacological, and behavioural sciences has been noted. Major contributions have come from learned helplessness theorists, Harlow and his coworkers, and Behaviourists of the Skinnerian tradition.

Depression is an important part of LH theory. However, it is peripheral to the major concern of this thesis. Consequently, consideration of the relationship of LH to depression and the other psychological models of depression will be cursory.

Seligman (1972, 1973, 1975a, 1975b). in the tradition of Pavlov (1926), Liddell (1953), Masserman (1943), and Harlow (1966a, 1966b) has claimed that an apparently maladaptive behaviour observed in the laboratory (the interference effect) represents a naturally occurring form

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1. An extensive coverage of the problems involved in the definition and classification of depression is found in Becker (1974) pp 15-55. Although a controversial area, some consensus appears to be emerging for the validity of an endogenous-reactive distinction, probably best conceptualized as a continuum, with a further unipolar-bipolar division at the endogenous pole. See also Eysenck (1970). An account of more traditional theorizing is also found in Becker (op. cit.), particularly pp 71-101. An attempt to synthesize a number of the traditional conceptions with recent experimental work has been made by Akiskal & McKinney (1974, 1975).

of psychopathology (in this instance reactive depression). Unlike these other experimenters, Seligman has claimed that it is not sufficient to base this correspondence on superficial similarity, but that it is necessary to demonstrate prarallel symptoms (behavioural and physiological), etiology, cure, and prevention. To the extent that this is achieved, it is maintained that it is then valid to apply the more rigorous experimental findings from LH to human depression.

LH theory has much in common with the positions of a number of cognitive theorists on depression (eg. Beck, 1967; Davis, 1970) and Bibring (1953), a Neofreudian. Indeed, Becker (1974, p 117) claims that the central theoretical notions used to account for the interference effect in dogs came directly from the writings of Bibring.

In contrast, the S-R theorists worked in reverse. They followed the lead of Ferster (1966) and applied theoretical conceptions derived from animal experimentation to human depression. Ferster began with Skinner's (1953) idea that the major datum of a depressed person is a reduced frequency of many behaviours in which the person normally engages. He then posed the question: how has behaviour in the animal laboratory been reduced in frequency? He gave three answers: (1)schedules of reinforcement with low rates of positive reinforcement including the extreme case, extinction; (2) high frequencies of aversive stimuli;

and (3) sudden changes in controlling (discriminative) stimuli.

A variety of Behaviourists have subsequently taken up these propositions and extended them into models to account for depression. Examples are: Lewinsohn et al (1969), McLean et al (1973), Jackson (1972), Lazarus (1968a, 1968b), Costello (1972), Burgess (1968), Klinger (1974, 1975), Wolpe (1969), and Ferster (1973). Harlow's methods can also be considered to be a case of (1) and/or (3) of Ferster's (1966) statement.

LH relates to these behavioural models in two ways. The first is Seligman's (1975) claim that LH theory subsumes many of them - namely, those that involve extinction or sudden changes in discriminative stimuli (which in practice cannot be separated from extinction because they also have secondary reinforcing properties). For example, Seligman cites Harlows' isolation and separation studies as instances of LH. Secondly, whereas most psychopathologists would probably agree that deviant personality functioning is a joint outcome of both predisposing (organismic) and situational factors (expressed for example in Akiskal & McKinneys' 1974/1975 concept of the "common final pathway of depression"), the behavioural conceptions focus exclusively on situational determinants. In contrast, the psychodynamic positions stress early experience. It may be that a cognitive position like LH can provide a more comprehensive framework that can ultimately integrate both types of determinants?

In passing, it should be noted that LH theory at one point is in conflict with an important aspect of a number of the S-R positions. According to Seligman, the interference effect (and by implication, depression) stems from the perception of independence between behaviour and outcomes. This implies that the absolute amount of reinforcement received, independent of behaviour, should not affect this interference. In contrast, Lewinsohn (1972) for example, claims that depression is a consequence of low rates of positive reinforcement. To test these two positions in the one design may however prove difficult. For example, there is some evidence that low rates of reinforcement administered noncontingently are more likely to be perceived as noncontingent than high rates (Jenkins & Ward, 1965; Wortman & Brehm, 1975). Hence, the effects of uncontrollability and the amount of reinforcement would be confounded.

CHAPTER 2. THE INTERFERENCE EFFECT IN ANIMALS

INTRODUCTION

A major concern of research subsequent to the early dog studies has been the demonstration of interference phenomena in other species and the obtaining of further description of the effect. With the subsequent development of LH theory as a model for depression and its extension to include the effects of appetitive events, additional hypotheses have been generated and empirically tested.

The reaction aroused by the LH position from the S-R and physiological theorists has led to increased refinement in the formulation and testing of hypotheses from all sides. Hundreds of experiments have now been conducted which bear on these issues. Extensive reviews have appeared by Seligman (1975b) and Maier and Seligman (1976). A brief overview only is presented here, along with some critical comment.

PRE-1967 STUDIES

Although the term learned helplessness was first coined by Overmeir and Seligman in connection with the 1967 series of dog experiments, a number of studies already existed in the literature that showed deficits in escaping or avoiding shock after experience with inescapable shock.

A review of these studies is contained in Maier et al (1969). They include fifteen rat studies, the first to appear having been conducted by McCulloch and Bruner (1939). Other studies used cats (1), dogs (1), fish (2), and humans (1). Although these studies did not use the triadic design, Maier et al accepted them as evidence of the interference effect resulting from uncontrollable shock and to therefore support their dog findings.

THE INTERFERENCE EFFECT

Maier and Seligman (1976) review the experimental findings under the headings of motivational, cognitive, and emotional deficits. Although the distinctions between these three terms are not always particularly clear at the animal level, this division will be used here to order the findings - mainly because they are the constructs that relate directly to Helplessness theory, and because they will be used in later discussions of the human literature where they are somewhat more distinct.

Motivational Effects

The tendency for animals to respond actively to trauma in a new situation after having been exposed to uncontrollable shock has been shown to be impaired in a variety of species. Since the early dog studies, further research has included dogs (eg. Overmier, 1968; Seligman & Groves, 1970), cats (Thomas & Butler, in press), fish (Padilla et al, 1970), and rats (Bracewell & Black, 1974;

Ellis et al, 1975; Maier & Testa, 1975; Seligman & Beagley, 1975; Seligman et al, 1975). It is interesting that the earlier rat studies (reviewed in Maier et al, 1969; Seligman et al, 1971) showed small or no effects. A number of the recent studies have shown that it is necessary for the escape task to be relatively difficult (eg. 3 bar presses instead of 1) to reliably produce a deficit similar to that found in dogs.

Cognitive Effects

The phenomenon where experience with uncontrollability produces difficulty in learning that responses have succeeded, was noted in the early dog experiments. Maier and Seligman (1976) also claim that it occurs in rats. However, apart from two experiments by Maier and Testa (1975) where it can be inferred, nowhere is there an account of this phenomenon defined and measured independently of the so-called motivational deficits. This construct is poorly operationalized at the animal level and evidence for it is consequently weak.

Emotional Effects

A number of studies using weight loss, defecation, water intake, and ulceration as dependent variables, indicate that some parameters of uncontrollable shock and other trauma (eg. physical constraint, cold water swim) result in more emotionality than escapable trauma (e.g. Weiss, 1968, 1971a, 1971b, 1971c; Moot et al, 1970; Disederato & Newman, 1971; Payne, 1972). These studies contradict the findings of Brady et als' (1958) executive monkey experiment which were probably an artifact of the way subjects were selected and assigned to experimental and control groups (Sines et al, 1963). Uncontrollability is also a feature of the so-called 'experimental neuroses' studies (e.g. Pavlov, 1927; Masserman, 1943; Strobbel, 1969). As indicated previously however, the relationship of all these emotionality findings to LH theory and the other interference effects is uncertain. This is reflected in both Seligman's ambivalance toward them in his theoretical writings and in the tendency to neglect such effects in his own experimental work.

Time Course

An early dog experiment (Overmier & Seligman, 1967) found that experimental dogs were characterized by the interference effect 24 hours after exposure to inescapable shock but not at 48, 72, or 168 hours. Subsequent work has not found this transient effect under any conditions in either dogs (when given more than one inescapable session or cage reared - ref. Seligman & Groves, 1970) or any other subhuman species. In rats, the effect appears to be permanent after one session (if difficult tasks are used as the criterion).

Although Maier and Seligman (1976, p 38) see this discrepancy as creating a major problem for LH theory, the inconsistency appears to be resolved by Glass and Weiss's 1976 series of experiments. In summary, they isolated two separate interference effects in rats. The first type is short term in duration and follows exposure to high intensity, short duration inescapable shock. Their earlier work (Glass et al, 1975; Weiss & Glass, 1975; Weiss et al, 1975, 1976) indicated that this effect is mediated by a disturbance in central neurotransmitters. The second type of interference effect follows from lower intensity, long duration shocks and is mediated by a learning process (Glass & Weiss, 1976a, 1976b). These writers claim that the early dog studies produced the first type of effect, whereas other studies have used longer duration stressors of weaker intensity and are of the second type. This distinction helps clear up much of the confusion that is evident, for example, in Maier and Seligmans' (1976) review.

Generalization

Critical to the helplessness concept is the notion that an expectancy of no control in one situation generalizes to another situation where an expectation of no control is inappropriate. Thus, the experimental procedure involves demonstrating the interference effect on a task performance that differs from the original training situation. This generalization effect is also crucial to claims that LH is an appropriate model for depression - a state characterized by its wide effects upon an individual's behaviour. Maier and Seligman claim that uncontrollability does have consequences for a wide range of behaviour (op. cit.,p 10). However, as was noted previously, LH theory itself is very weak on defining the extent (boundary conditions) of the interference effect.

The studies already outlined show a transfer of effect from some types of apparatus to another when shocks occur in both. Experiments by Braud et al (1969) with mice, McCulloch and Bruner (1939) and Rosellini and Seligman (1975) with rats, indicate a somewhat broader transfer to aversive situations involving stimuli other than shock. In general, the boundary conditions of the effect are little explored to date.

IMMUNIZATION AND DEVELOPMENTAL STUDIES

It has been noted that in the early dog studies, the interference effect was produced in only two-thirds of the experimental animals and that it was found in five percent of the untreated controls. It was proposed by Overmier and Seligman (1967) that this differential response was due to individual differences in the early experiences of the animals. An hypothesis consistent with this experimental finding and with LH theory is that prior experience with controllable trauma could interfere with subsequent learning that trauma is uncontrollable. Indeed, this'immunization' effect is evident in the early Pavlovian fear conditioning experiments where the animals were trained on an avoidance task prior to the helplessness training.

Two further experiments in the literature bear on this issue. Seligman and Groves (1970) found it took two sessions of inescapable shock to produce a permanent interference effect in cage-reared beagles whereas it took four sessions to produce this effect in mongrels raised outside the laboratory. They argued that the latter would have had more opportunity to experience control over aversive experiences. However, such an interpretation is also confounded by genetic differences. Hannum et al (1976) found that of three groups of rats given four sessions of inescapable, escapable, or no shock shortly after weaning, only the inescapable group failed to escape at 90 days of age when tested on a FR-3 lever press escape task. It is unfortunate that this study did not report the percentage of subjects who were 'immune' in the inescapable condition. As it stands, no studies have focussed on the interaction between direct manipulation of early experience and later experience of no control.

Given the importance LH theorists give previous experience in explaining (explaining away?) the variation in response to their experimental manipulations, this is a serious omission. Considering further that LH is considered a model for human depression, and given the general view of the role of early experiential (eg. infant separation) and genetic determinants, such an approach could be expected to enhance the model's claim to parallel this form of psychopathology. Trait variables could be delineated by both genetic and early experiential manipulations and included in procedural definitions of learned helplessness. This issue will be raised again at the human level.

THE WIDER DEFINITION

It was noted that in connection with an extension of LH theory, the concept was broadened to include uncontrollable nonaversive events and extinction. Do these manipulations produce an interference effect?

A series of experiments with pigeons explicitly attempted to test the hypothesis that the noncontingent delivery of food would produce an interference effect (Engberg et al, 1973; Walker, 1974). A study by Bainbridge (1973) is also relevant. These studies support the view that exposure to appetitive events delivered independently of behaviour disturbs the aquisition of appetitively motivated responses. It is not known if the effect transfers to aversively motivated behaviour. However, these experiments are open to both methodological criticisms and other interpretations besides LH (Gamzu et al, 1973).

Although LH theorists claim that the 45° uncontrollability line includes extinction, they do not cite the experimental literature on extinction to support their case. The exception to this is Harlow's separation studies which are probably best regarded as examples of extinction. There is some contradiction involved here, however. At a symposia (reported in Friedman & Katz, 1974), Seligman argued that extinction relates to the frustration literature, not depression, and as such that it leads to the energizing of responding. It is of interest that Klinger (1974, 1975) uses the extinction findings as a central part of his model of depression and shows that rats no longer rewarded in a runway initially show an activation of responding in the open field, followed by a transient downswing into a quiescent phase.

In summary, it appears that there is some evidence for an interference effect related to the two aspects of the extended definition of uncontrollability, but that their relationship to the interference effects engendered by aversive stimuli is uncertain.

ALTERNATE THEORETICAL POSITIONS

The LH explanation of interference has been challenged by a number of alternate hypotheses. Unlike the wide LH conceptions, these positions have sought only to explain the finding that animals exposed to inescapable shock later fail to learn to escape and avoid shock in a shuttle box. However, from the literature reviewed, it is evident that the bulk of experiments conducted to test LH formulations have in fact been of this type.

The first two of these alternative hypotheses, namely the Adaptation Hypothesis and the Sensitization Hypothesis, have been fairly convincingly demolished (see Seligman et al, 1971; Seligman, 1975b; & Maier & Seligman, 1976 for a marshalling of the experimental evidence against these positions).

In the last three years, more serious challenges have come from a number of S-R theorists who have proposed that the interference effect is produced by the animal learning an incompatible response during exposure to uncontrollable aversive stimuli that generalizes to the shuttle box (Bracewell & Black, 1974; Anisman & Walker, 1972, 1973; Anisman, 1973; Levis, 1976) and from Weiss and his coworkers who propose that inescapable shock is a severe stressor which disturbs the neurochemical substrate required for adaptive responding (Weiss et al, 1970, 1974a, 1974b).

Increasingly, LH theorists have organized their animal experimentation around the challenges posed by these alternate positions. The complexity now involved is revealed in the twenty pages taken in Maier and Seligmans' (1976) review article to argue their case vis-a-vis the other two major positions. Glazer and Weiss' (1976a, 1976b) experiments have resolved some of the confusion between LH theory and their physiological model by isolating two types of interference effects with different antecedents. Their findings also supported the competing response theories with respect to the learned effect.

The increasing polarization between the S-R and the cognitive LH positions, coupled with the large space they have received in the Journal of Experimental Psychology this year, suggests more is at stake than an explanation of interference effects. A major paradigmatic clash in the wider field of animal learning is involved. However, although an increasing amount of the LH literature is subsumed under this division, and although another integrative review of this literature is already required, this issue is largely encapsulated within the animal field. This is not the major concern of this thesis.

This work makes it even more evident that it is erroneous to talk of the LH effect or even, the interference effect. There is experimental evidence that each of the three major positions best explains, some that each does not explain, and confused areas where both S-R and LH theories can account for the same data.[1] No doubt each of these effects often overlap in a given case.

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1. Space and a different emphasis in this thesis precludes elaboration to support this assertion. See Maier & Seligmans' (1976) review which puts LH theory in a dominant position, Levis's (1976) critique and alternate S-R formulation, and Glazer and Weiss' (1976a, 1976b) articles discussed above.

DEPRESSION

For a review of the animal literature relevant to Seligman's assertion the LH is a suitable laboratory model for depression, see Seligman; 1974, 1975a, 1975b. Reduced initiation of voluntary responding, difficulties in learning that a response produces an outcome, aggressive deficits, loss of appetite, and norepinephrine depletion are claimed to be symptomatic of both "LH" and clinical depression. Norepinephrine depletion is also implicated in the major hypothesis for the physiological origin of depression (the cathecholamine hypothesis). Seligman claims that some established psychotherapies for depression parallel the methods he used to break up interference in dogs and that ECT and atropine ameliorate both interference and depression.

Clearly a number of parallels have been shown to exist between depression and the concommitants of exposure to uncontrollable aversive events. However, much of the evidence appears to be related to Weiss's transient effect which is not learned and therefore not accounted for by LH theory. Another difficulty for LH theory is that it is supposed to be a model for reactive depression. The most convincing studies (e.g. norepinephrine depletion and response to ECT and atropine) show closer parallels with endogenous depression.

CONCLUSION

In general, there is good support in the animal literature for the wider LH claim that experience with uncontrollable outcomes produces deficits in later escape-avoidance behaviour. There is also some evidence that it has more general effects although the boundary conditions are still poorly delineated. It is now clear that the interference effect is not a unitary phenomenon. At least three separate mechanisms are implicated in producing the sequelae to aversive stimuli and it seems that the effects associated with extinction are different again. LH theory and the findings of the early dog studies have received support in the wider animal literature although the situation is now seen to be more complex and LH theory does not account for all of the emerging data. It is argued that the LH position could be strengthened by the inclusion of organismic variables.

CHAPTER III. THE INTERFERENCE EFFECT IN MAN.

INTRODUCTION

Human studies of learned helplessness originated in an attempt to replicate the findings of the early dog experiments at the human level. With the extension of LH theory came the additional concern to demonstrate parallels between interference phenomena and depression. These have also been major concerns in the animal experimentation.

At variance with the animal research has been the absence of any challenge from the S-R or physiological positions. LH theory appears to be a more valid model for interference effects in man. This may not be too surprising considering that the central postulates of the theory were probably borrowed from writers such as Bibring (1953) and Beck (1967), whose formulations were developed to account for aspects of human behaviour in the first place.

The position stated here is at variance with that of Wortman and Brehm (1975) who have also considered both literatures. They imply that LH theory makes a better account of the animal findings. However, this writer shares their view that there is a need to supplement LH theory with additional theoretical inputs before it can adequately embrace the current human experimental data.

To date, no comprehensive review of this body of work has been conducted. Human experiments are woven into

Seligman's (1975b) and Maier and Seligmans' (1976) reviews to support their general case. However, they are not brought together and considered as a separate literature. For the reasons indicated on the previous page, this separate consideration is not only justified, it is necessary to take account of the different nature of the human experimental findings. Although Wortman and Brehm (1975) have a separate section on human experiments, since their review, the field has mushroomed.

RELATED FORMULATIONS

Prior to the human experimentation, a variety of accounts in the general psychological literature suggests that lack of control over reinforcement (both real and perceived) is related to behavioural disturbances. Apart from heightened anxiety and the proposals with respect to reactive depressions (see Seligman, 1975b), Roth and Bootzin (1974) note the following: Cofer and Appley (1964) and Janis and Leventhal (1968) for interference to performance in stressful or dangerous situations, Bettelheim (1960) for the behaviour of prisoners in concentration camps, and Mowrer (1960) for certain aspects of institutionalization in psychiatric patients. Seligman (1975b) devotes a chapter to a review of literature on sudden ("voodoo") deaths and related phenomena.

The most relevant and least anecdotal support for the applicability of the LH construct to humans is found in the locus of control literature. This is reviewed and discussed in a later chapter.

THE INTERFERENCE EFFECT

Methodological Considerations

Like the majority of the animal experiments, the early human studies used exposure to uncontrollable electric shock to induce the interference effect. Before the evidence for the separate aspects of the interference effect is outlined, the first two human experiments will be considered in some detail because they contain methodological shortcomings that obscure interpretation. The points that arise from this discussion will be of value when the wider evidence is inspected.

The first explicit attempt to demonstrate the interference effect in humans was conducted by Fosco and Geer (1971). Four groups were given different amounts of experience with no control over an aversive event before being able to control that same event. Specifically, each subject was given the task of guessing the correct sequence of buttons on a panel. If the subject failed to select the correct solution within four seconds from the onset of a warning light, he received an electric shock. Twelve problems were presented to each subject. Group 1 were given no insoluble problems, Group 2 had 3 insoluble problems, Group 4, 6, and Group 4, 9. The final 3 problems in each condition were solvable and the number of errors made by each group were recorded. The results were significant and in the predicted order, with more mistakes occurring among ss who had more experience with no control. These results were interpreted as supporting the LH position.

Is this evidence for an interference effect mediated by learned helplessness?

This experiment involves a major departure from the paradigm typical of the animal experiments. The initial task was an avoidance task, not an escape task as is used in the animal experimentation. Additionally, when the subjects did not manage to avoid shock, it was of 50 msec. duration. This is a fraction of the time that typified the animal experiments. Indeed, Glazer and Weiss (1976a, 1976b) have indicated that the learned type of interference has not been demonstrated in animals with shock durations under 5 seconds. The type based on neurotransmitter depletion has, but only with extremely high levels of shock intensity - much higher than was used here.

Additionally, the interference effect is defined as involving inappropriate generalization from a situation of no control to another situation where control is possible. In the animal experiments, the concept of learned helplessness relates to performance in a <u>new</u> situation where the previous expectation of no control is inappropriate. In contrast, the test for the interference effect in this study was made in the same situation where experience with no control occurred. At best, one could conclude that this is evidence that experiences of no control influenced behaviour in the situation in which it was induced. This is not however an example of the type of interference effect discussed previously.

Closer inspection reveals that even this conclusion is not strictly justified. In addition to each group receiving different amounts of no control, each group also received more exposure to shock. In connection with the animal experimentation, the importance of separating the effects of controllability from the effects of aversive stimulation per se was noted. The role of the triadic design in this respect was described.

Thornton and Jacobs (1971) also administered electric shocks to subjects while they worked on a button pressing task. One group could avoid shocks by pressing the correct button and they were informed of the fact that they could exert this control. Two other groups were yoked to this group. One of these was asked to carry out the training task but was informed that no relationship existed between their performance and the shocks. The other yoked group was merely asked to accept the shocks. A further group was asked to work on the task but was not shocked. After completion of the training phase, subjects were taken to another room and given a soluble button-pressing task to work on. The group that could avoid being shocked and was informed that they could prevent being shocked and that they could control the situation, did significantly better on this task than the other three groups that did not differ significantly from one another.

Again this result was interpreted by its authors as supporting the LH hypothesis. This conclusion however, is not justified. Although the design improved upon the previous experiment by controlling for the separate effects of shock trauma and controllability and presented the test task as a somewhat separate situation, it had other defects.

Again it involved an avoidance rather than an escape task. An additional confusion was the confounding of the task manipulations with the instructions to the subjects - they were informed how much control they had. Finally, the logic involved in the interpretation of the results is faulty. The subjects who had no control did no worse than the other two control groups. The most probable explanation is that the prior instructions and experience enhanced the performance of the avoidable shock group. This finding is at variance with the animal work and shows the need to consider the comparison between the inescapable and no treatment groups - both of which are included in the triadic design, along with the escape group. The enhancement of the escape group's performance is also of interest. While not predicted by LH theory, neither is it incompatible with it.

These first two attempts to replicate the animal findings and demonstrate an interference effect in man are equivocal because of methodological departures from the typical animal paradigm. They are instrumental however in showing some of the finer points involved in experimentation in this area.

Motivational Effects

Hiroto (1974) performed what has been widely claimed to be the first human study to replicate the findings of motivational deficits following exposure to uncontrollable aversive stimuli in animals (Seligman, 1975b; Maier & Seligman, 1976). The design Hiroto employed was complex and will be discussed in more detail later. Briefly, what was entailed is as follows.

Subjects were shown a panel with a button on it. They were informed that from time to time they would receive a loud tone and that there was something they could do to stop it. For one group this was the case (escape condition) but, for the other group (inescapable condition) this was not so. A no pretreatment group was also included. The first two groups received 30 trials with the button-pressing task. All subjects were then tested for the interference effect in a hand shuttle box. To escape noise, the subject simply had to slide a knob from one side to the other. This was broadly analogous to the response that the dogs had to make to escape shock in the early experiments.

On this task, no escape subjects had longer response latencies and more failures to escape than subjects in either of the other two groups which did not differ significantly from one another. Additionally, 34 percent of the experimental subjects failed to reach a predetermined escape criterion compared to 8 percent in the other two groups. Hiroto concluded that these results showed remarkable similarity to those of the animal studies, albeit that they were somewhat less dramatic.

Two additonal factors were varied in this design. One was locus of control. This aspect of the experiment will be discussed later. The other was a variation in instructional set. One half of the subjects were told that what they did in the shuttle box was a test of skill. The other half were told that what they did was governed by chance. It was found that those subjects receiving chance instructions did poorly irrespective of what additional experimental manipulation they had received. Because this produced the same result as exposure to uncontrollability, Hiroto concluded that the common factor was the expectation that responding and outcome were independent and that this undermined the motivation to respond. This additional manipulation affords a more direct test of the LH hypothesis than is available to the experimenter at the animal level.

Unfortunately there are two considerations that reduce the certainty that can be given to Hiroto's interpretations of his results.

Although Maier and Seligman (1976, p 9) claim that this study used the triadic design with the escape group receiving the same noise as the inescapable experimental group, this was not in fact the case. They were not yoked and on average, the former group received 1.4 seconds of noise per trial in comparison to the latter's 5 seconds. Consequently, once again noise and controllability are confounded. Wortman and Brehm (1975) discount this as a demonstration of interference on this basis. However, this involves another oversight on the part of reviewers. Hiroto was aware of this weakness in his design and attempted to rectify it by asking the subjects to rate the stressfulness of the tone. The mean ratings of the two groups exposed to the noise did not differ significantly, so it would appear that the differential exposure to noise did not produce the interference effect. Although the situation remains somewhat equivocal, on balance it appears to be more in support of an effect than in being an uninterpretable experiment.

Another possible confounding factor is that the inescapable group may have formed complex hypotheses as to how the button-pressing task might be solved.[1] These

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1. This has been shown to interfere with problem solving (see Levine, 1971) although there is no evidence to date showing generalization of such interference to another task.

could then have been generalized to the 'simple' shuttle task where they disrupted performance. Although plausible and unable to be ruled out, it has been invoked post hoc whereas the LH hypothesis is a priori and thereby the more parsimonious of the two.

Krantz et al (1974) conducted two experiments that they claim indicate an interference of the LH type.

The first experiment exposed two groups of male subjects to differing levels of aversive tone (107 dBA and 78 dBA) which they could terminate by manipulating two switches. Each of these groups was yoked to another that could not terminate the noise. All subjects were then presented with the same noise and a test task very similar to that employed by Hiroto. Self ratings and skin conductance response recordings were also taken. These latter measures indicated that the experimental manipulations were successful in inducing increased stress in the high noise groups and feelings of inability to control the noise in the no control groups.

The groups that had not controlled the noise were found to be more impaired than the escapable groups on five of the six shuttle box dependent variable measures. The differences were greater between the low stress goups.

The second experiment was the same as the first except that it employed only the two high stress groups and gave them experience with two separate instrumental tasks prior to the shuttle task. This time, the differences between the two groups were very large. Two-thirds of the inescapable subjects stopped responding on the test task - they 'gave up'.

These two studies strongly suggest the presence of an interference effect associated with uncontrollability. However, again there is some confusion caused by inadequate design. There was no no treatment control. Although there was no augmentation of responding in the group that could control the noise in Hiroto's experiment, this was not the case in Thornton and Jacobs' study. If this effect was present in the experiments under discussion, the difference between the two groups could have been due to facilitated responding in the control group and/or depressed responding in the no control group. Without the appropriate control, this issue cannot be definitely decided one way or the other.

The three experiments examined in this section suggest that a motivational deficit similar to that demonstrated in a number of animal studies occurs in man. However, methodological problems reduce the certainty with which this can be asserted. Fortunately, more recent experiments have improved in this respect.

Hiroto and Seligman (1975) conducted a series of five experiments. Apart from attempting to demonstrate interference phenomena, they were interested in investigating generalization of such effects to behaviours different to those used in the pretreatment phase. This aspect of there work will be taken up later.

Four of their experiments were run simultaneously. In experiment 1, subjects received instrumental pretreatment followed by testing on another instrumental task. In experiment 2, an instrumental task was followed by a cognitive test task. Experiment 3 involved a cognitive task followed by an instrumental task. Experiment 4 involved the remaining logical combination of cognitive pretreatment followed by another cognitive task. All four experiments used the triadic design so that in each, one group received escapable/soluble pretreatment, a yoked group received inescapable/insoluble pretreatment, and a third group was not required to attempt the pretreatment tasks.

The instrumental pretreatment subjects were told that pressing a button correctly would terminate aversive noise. This was so for the escape group but not for the yoked inescapable subjects who received identical durations of unsignalled, 90 dBA bursts of noise. The other group was asked to listen to the noise but was not required to attempt to stop it. The cognitive pretreatment involved solving Levine type concept formation problems. One group (soluble condition) was given correct feedback and could solve the problems. Another group of subjects (insoluble condition) was given identical problems but with incorrect feedback as to how they were progressing. The third group was just asked to inspect the problems and not instructed to solve them.

The authors argued for the applicability of their cognitive pretreatment innovation by claiming that just as a soluble discrimination problem is controllable in the same sense that an escapable shock is controllable, then an insoluble discrimination problem is uncontrollable in the same sense that an inescapable shock is uncontrollable. In both of the latter, outcome is independent of the subject's responding.

After pretreatment, the subjects were moved to another table in the same room where they had received the pretreatment and presented with a different task. The instrumental test task was the same that Hiroto (1974) used. The cognitive task involved a series of 20 solvable anagrams, each with the same letter sequence. Three analogous dependent variable measures were derived from the subjects' performances on these two different tasks.

Three of the four pretreatments induced impaired performance in those groups that received uncontrollable outcomes. On almost all measures, they were significantly inferior to the escapable controls and on about 50 percent of occasions, to the no treatment controls as well. No significant differences between the two control groups were obtained.

The cognitive pretraining-cognitive testing experiment did not reveal significant differences between any of the groups. However, Hiroto and Seligman repeated this experiment with a further problem added to the three already in the pretreatment. With this additional exposure to insolubility, the predicted differences were obtained.

This series of experiments is strong evidence for the existence of interference effects in man. They are not characterized by the methodological flaws that obscured interpretation of the previous experiments. Indeed, one of these experiments is a replication of Hiroto's earlier study. On this occasion, the ambiguity in interpretation has been removed by the addition of a yoking procedure.

A number of recent experiments have used the same tasks that were used in this series of experiments, along with the triadic design.

As part of a wider study on the reversibility of interference effects, Klein and Seligman (1976) replicated the first experiment in Hiroto and Seligmans' 1975 series. The results were consistent with those of that experiment as well as with the earlier Hiroto (1974) findings.

Miller and Seligman (1975) studied the effects of uncontrollable aversive stimuli upon depressed and non-depressed students. Apart from this additional factor, their design and use of experimental tasks was identical to that of the second Hiroto and Seligman experiment. The results of their non-depressed group replicated those of the earlier experiment. A further study, concerned primarily with the physiological sequelae of the interference effect, has also used this particular design (Satchel & Proctor, 1976). They obtained the same results.

Bensen and Kennelly (1976) used the same experimental tasks as the fourth and fifth experiments in the 1975 series. The only difference from the fifth experiment was their addition of a further discrimination problem in the pretreatment. Their results partly support those of the earlier study in that one of the three dependent variables showed a deficit in the insoluble group. An additional finding was a significant enhancement in the performance of the soluble group relative to the no treatment control on this same measure. Klein, Fencil-Morse, and Seligman (1976) used the same cognitive pretreatment as that employed in the fifth 1975 experiment. They found that unsolvable problems disrupted the anagram performance of their non-depressed subjects. Significant deficits were obtained on all four dependent measures used. They did not find the enhancement or "mastery" effect in the soluble group as Bensen and Kennelly had.

Although not intended to test LH hypotheses, Sherrod and Downs (1974) conducted an experiment that is also relevant to the issue of motivational deficit. The experimenters themselves cast the study in the framework of the effects of stimulus overload on altruism. However, what they did is as follows.

All subjects were given a task which required them to find proofreading errors while listening to random numbers being read out aloud. One group performed this task while also listening to a very noisy background tape. Another group received the same pretreatment but was informed that they could push a button to terminate the noise if they wished, but that the experimenter would prefer them not to. None did. The third group worked at the task without the background noise. After this phase, the subjects were informed that the experiment was finished. However, as the subjects left the laboratory, another experimenter approached them and asked it they would assist with the compilation of some pretest data. Each subject was given 200 arithmetic problems to solve.

The subjects who had received the uncontrollable aversive noise completed fewer problems than both those who were led to believe they controlled the noise, and those not exposed to noise. No differences were found between the groups in the number of mistakes made. Although the authors interpreted the results in terms of altruism, in the light of present considerations, it would appear to be a good example of a motivational deficit following exposure to uncontrollable aversive noise.

In contrast to these consistently positive findings, is an interesting study by Roth and Bootzin (1974). They attempted to assess learned helplessness hypotheses in humans with what they termed "ecologically more valid" methods.

Concept formation tasks were used in the pretreatment phase. These tasks were insoluble for subjects in the two experimental groups because they received random feedback as to their progress. One experimental group had this experience on one concept formation task, the other on two. One control group received the same task as the first experimental group but, in addition, received contingent feedback so that the task became solvable. A second control group received no pretreatment.

Following pretreatment, the subjects went on to the test phase which, as in Sherrod and Downs' study, they believed was a separate experiment. It took place in another room with a different experimenter. Here they received further concept formation problems via a TV monitor. At regular intervals, the screen became blurred, preventing task solution. Contrary to predictions, subjects in the two "helpless" groups made many more adaptive attempts to have the malfunction corrected (e.g. by getting up and looking for the experimenter) than subjects in the control groups. The experimental subjects were also found to consider themselves to be more in control of their success or failure in the testing phase than the control subjects. A significant correlation was also found between feelings of failure and frustration in the pretreatment and feelings of control in the test situation.

Although this experiment is open to a number of interpretations (see Wortman & Brehm, 1975, pp 303-304), it suggests that subjects who are exposed to an uncontrollable situation are more active and more likely to initiate responding in another situation than are control subjects. This is the exact opposite to LH predictions. It is also at variance with the other experiments reviewed. The findings and implications of this 'deviant' experiment will be taken up again, after additional findings have been considered.

To conclude this section, it seems reasonable to assert that a number of well designed and consistently replicated studies have demonstrated a motivational deficit in human subjects. However, apart from the one discrepant result just described, a further qualification needs to be made. On a number of the dependent measures used in these studies (particularly those from the anagrams task), it is difficult to clearly separate those that measure motivation from those that relate more to Seligman's cognitive construct. It should also be noted that the strength of the claim for a motivational deficit being demonstrated will be further qualified when the key issue of generalization is considered.

Cognitive Effects

The learned helplessness formulation involves cognitive factors in two different ways. First, the belief that reinforcement is independent of behaviour is seen as the causal mechanism underlying the motivational deficit. Secondly, the inability to associate responding with reinforcement in a new situation (learning impairment) is considered to be a major manifestation of the interference deficit.

Although it is possible to assess the latter of these two at the animal level (not that it has been done very adequately), the former remains a very unobservable hypothetical construct. Indeed, this is one of the major grounds upon which the S-R Theorists have attacked LH theory at the animal level. At the human level however, the assertion of cognitive changes mediating motivational deficit is more available for direct empirical testing. Let us consider this aspect first.

In Sherrod and Downs' experiment, it was noted that the controllable noise group did not actually experience controlling the noise, they were simply told that this was possible. Apart from this, they received exactly the same treatment as the group that was impaired in post test performance. Clearly, the different cognitions in the two groups was the crucial factor.

The same finding characterized Hiroto's (1974) experiment. It was mentioned earlier that one of the experimental manipulations was chance set versus skill set. The subjects who were told that the outcomes of their responding on the shuttle-task were governed by chance, responded as poorly as those who had experienced uncontrollable noise. Again this suggests that the common factor underlying the observed deficits is the belief that responding and outcomes are independent. Besides these examples, a body of experimental work outlined in Glass and Singer (1972), although not formulated to test LH theory, contains a number of experiments where expectations were modified by instructions. Their results support the view that it is the expectation and not the objective conditions that are crucial in producing interference effects.

A number of the experiments outlined in the previous section gave post questionnaires to their subjects to determine whether the experimental manipulation was effective in inducing the expected cognitive set. Consistently, the belief that one is helpless or lacks control coincides with the occurrence of interference phenomena.

The strongest evidence comes from studies that have explicitly set out to examine cognitive set. Both Miller and Seligman (1976) and Klein and Seligman (1976), in their second experiment, have addressed themselves to this question. Both used the same 3 (inescapable vs. escapable vs. no noise) x 2 (depressed vs. nondepressed) design as that of Miller and Seligman (1975), described previously. However, their main dependent variables differed. Of concern to us here was their common finding that the nondepressed inescapable subjects showed smaller changes in their expectancies for both success and failure on future trials after they had experienced either success or failure on previous trials. As the experimental manipulation that this group was exposed to in both experiments is the same as that which has produced interference effects in other studies (Hiroto, 1974; Hiroto and Seligman, 1975; Klein & Seligman, 1976; Miller & Seligman, 1975; Satchel & Proctor, 1976), then these results clearly support the central LH postulate that the motivational deficit is mediated by the perception of reinforcement being noncontingent or independent of skilled responding.

Thus, there is good evidence for the operation of the cognitive mechanism that is central to LH theory. It should be noted that this evidence only exists at the human level. In this writer's opinion, it cannot be validly generalized to support LH accounts of animal findings as Maier and Seligman (1976) do. Of course, it does not rule out the possibility that such mechanisms do operate in other species.

Cognitive deficits as a learning deficit is poorly operationalized at the animal level. Although there are means available to separate cognitive from motivational variables in human subjects, e.g. Nufferno Speed and Level Tests (Furneaux, 1961), this is a difficult operation and has seldom been attempted in the human helplessness experiments.

Although the separation of cognitive and motivational aspects is not completely clear, one of the measures from the commonly used anagrams task appears to be primarily a cognitive measure. The measure in question is the number of trials it takes before the common pattern to the anagrams is found. Of the seven studies that have used this measure (refer to the previous section), five obtained significant differences between the no control group and no treatment group. Two studies have used related anagrams measures that appear to be even more sensitive to the cognitive aspect, namely, the number of consecutive correct solutions prior to discovering the pattern and the conditional probability of solving an anagram given that the previous one was solved correctly. Both studies (Miller & Seligman, 1976; Klein et al, 1976) obtained the predicted results.

It is unfortunate that the studies using the finger shuttle box (Hiroto, 1974; Hiroto & Seligman, 1975; Klein & Seligman, 1976) did not mention the numbers of subjects who made a correct escape solution but who subsequently failed to escape. This is analogous to the response that was seen in the early dog experiments and led to the claim for a cognitive deficit in the first place. As most subjects on the human shuttle task learn to escape finally, irrespective of experimental condition, it may be that this did not occur?

Three other studies have looked somewhat more specifically at cognitive factors.

The first is the study previously referred to, by Sherrod and Downs. Although the inescapable subjects in this experiment attempted less arithmetic problems at the post test (motivational deficit), their capacity to solve them correctly (cognitive measure) was not significantly different from the other two groups.

The second is a study by Glass and Singer (1972). An account of this well designed experiment is found in Wortman and Brehms' (1975) review. The full outline is in Glass and Singer (1972) pp 109-120. The results showed that subjects who were led to believe that their poor performance on a series of puzzles was responsible for them receiving uncontrollable shocks, were impaired on post treatment cognitive tasks. The tasks employed included a soluble puzzle, a proofreading task, and the Stroop Colour Word Test.

The third study was one of the first to attempt to demonstrate interference phenomena in human subjects. It consists of two experiments by Thornton and Jacobs (1972). Both attempted to measure the effects of prior inescapable/ unavoidable shock training with a reaction time task on subsequent intellectual performance. The triadic design was used although the conventional helplessness paradigm was violated slightly. The shock was avoidable and the task instructions included information on the contingencies the subjects received. In both experiments, the groups receiving noncontingent shock performed significantly <u>better</u> on the post treatment tests of mathematical and verbal reasoning and perceptual organization. This is the opposite to predictions from LH theory.

From this review, it is evident that the case for the demonstration of cognitive deficits is somewhat weaker than for motivational impairment. However, on balance, the weight of evidence supports the learned helplessness position.

Emotional Effects

Recalling from the earlier theory section, Seligman (1975b) hypothesized that the presence of a traumatic stimulus elicits a heightened state of emotionality which continues until the subject discovers that he can or cannot control the trauma. If he can, fear is reduced. If not, fear also decreases and is replaced with depression.

Although first formulated in 1973, this is currently a confused and little studied area of LH theory. It is seldom mentioned in the work of Seligman and his coworkers. There is no discussion of it in Wortman and Brehms' (1975) account of the human literature.

Although this hypothesis has not been systematically investigated, there are scattered data in the literature that bear on it. In considering this material, a distinction is made between the changes that occur during exposure to aversive, uncontrollable stimuli, and the changes that follow from this exposure.

With respect to emotional consequences, a careful perusal of the LH studies already cited justifies the following comments. Where aversive tone has been used and ratings made, subjects have consistently rated controllable and uncontrollable noise to be equally aversive. Miller and Seligman (1975) administered the Multiple Affect Adjective Checklist following pretreatment and found that hostility, anxiety, and depression subscales were all significantly increased following experiences of no control but not of control or no pretreatment. A number of studies have found that uncontrollable subjects rated themselves as feeling more helpless and less in control during the pretest and test tasks. Roth and Kubal (1975), in a study yet to be discussed, found that the subjects exposed to unsoluble problems indicated that they felt helpless, incompetent, and angry.

Thus, although the uncontrollable noxious stimulus itself is not judged to be more aversive than a controllable one, exposure to the former typically elicits a range of negative affects, the predominant ones appearing to be helplessness and depression.

Further considerations and additional evidence however, indicates that this conclusion needs to be qualified. In so doing, the apparent contradiction between the ratings of the stimulus and its emotional consequences is also resolved.

To bear directly on the issue under consideration, the pretreatment employed in any study discussed should be one that has been shown to be able to produce either or both of the other two interference effects. However, although not meeting this criterion, there is a large body of literature that has focussed on personal control over aversive stimuli and its relationship to stress, that has a bearing on this discussion. Within this field, it has been widely held that perceived control over aversive stimuli reduces stress (e.g. Geer et al, 1971). However, Averil (1973), in his review of the complex and often contradictory literature concludes;

> ....the stress-inducing or stress reducing properties of personal control depend upon such factors as the nature of the response and the context in which it is embedded and not just upon its effectiveness in preventing or mitigating the impact of a potentially harmful stimulus. (p 286)

The significance of this statement for LH studies is only just starting to be appreciated. For example, Wortman et al (1976) found that it is not the experience of failing to control aversive stimuli per se that leads to more stress but the attribution of the failure to the subject's own incompetence. Such subjects rated themselves as more helpless, upset, frustrated, angry, aroused, and depressed than yoked subjects who attributed their failure to the experimental situation. Klein et al (1976) reached the same conclusion in a similarly designed experiment. These findings have wider implications for LH theory and will be taken up again.

This finding of the importance of attribution in mediating the emotional consequences is of considerable significance. For example, experimenters who have found that both the control and no control subjects rate noise as equally aversive, have used this to argue against Weiss's 1969 hypothesis that uncontrollable events are more aversive than controllable events and that this accounts for interference. However, as has been indicated, the effects of uncontrollable stimuli in typical LH experiments are more aversive in terms of their consequences. In terms of the attribution position, it is not the uncontrollable noise per se that is aversive. Rather, it provides information to the subject that he is incompetent. Thus, the consequences for the subject can be traumatic while at the same time he can perceive the noise itself as not being particularly stressful. It seems that the subjects are making a distinction the experimenters have failed to see.

To date, very few studies have looked at changes occurring during pretreatment. Two studies that attempted this from amongst those already reviewed are Fosco and Geer (1971) and Krantz et al (1974). The Galvanic Skin Response (GSR) recordings taken in the former study were claimed by the authors to be too variable for interpretation. The second study obtained reliably lower mean phasic Skin Conductance Responses (SCR) for the no escape group but failed to replicate this in their second experiment. Unfortunately, they used log conductance-change units to measure SCR. This method allows considerable error variance, particularly in studies where stress induction is involved (Lykken, 1972). Important differences may thus have been obscured by their crude measurement. A study by Glass et al (1973) is also relevant. They found no differences between the groups that perceived they were escaping shock and the yoked groups that could not escape. The dependent variables were phasic SC and spontaneous SC fluctuations.

It appears then that either there is no difference in arousal between the two groups, or that the inescapable group is less aroused. Again this appears to be contradictory to the findings at the level of affective consequences. However, recall that Sèligman's model postulates a decrease in "fear" or arousal in both groups. In the inescapable group however, it is replaced by depression. Although the psychophysiological concomitants of this state are not well known, it has been associated with a decrease in Skin Resistence Responses in a number of studies (Spiegel & Acker, 1967; McCarron, 1973). Thus, there could be no difference between the two groups in terms of overall arousal at the physiological level and yet, we could expect differences at the subjective level.

In point of fact, a very recent study, the only one to date to focus specifically on the psychophysiology of human interference phenomena, has found that the situation is more complex (Gatchel & Proctor, 1976). Using more sensitive measures than the previous studies, they found evidence over the later trials of both deactivation (lower

Tonic SC, smaller Phasic SCRs) and activation (greater spontaneous electrodermal activity) responses as a consequence of exposure to uncontrollable noise. They found no differences in heart tate. They considered this fractionation of reaction in terms of Lacey's (1967) multidimensional view of activation as extended by Schwartz (1974). In the light of this conceptualization, they interpreted the spontaneous GSR increase as evidence of greater emotional stress in the inescapable subjects and the deactivation responses as reflecting the decreased task involvement and motivation when they perceived their position as helpless.

This finding is in keeping with Seligman's emotionality hypothesis although it indicates that his reference to the unitary concepts of "fear" and "depression" is over simplistic. This result is also in keeping with the findings that were noted at the subjective level. It is also of interest that Gatchel and Proctor found the skin conductance differences between the groups persisting into the post test phase (anagrams task), until the inescapable subjects began to master the anagrams in the later trials. At that point, the group differences became non significant.

Although these data have not been collected together before, it is evident that by arranging them around Seligman's hypothesis, some consistency is apparent. Further studies linking attributional variables to physiological changes are indicated. Although a complex area, it does warrant further attention than it has received to date.

Time Course

In the animal experimentation, two major types of interference effects have been demonstrated. One type is mediated by neurochemical depletion following severe stress and is of short duration (about 24 hours). The other is learned (whether it be mediated by learned helplessness or learnt incompatible motor responses) and appears to be permanent unless special measures are taken to reverse it. These two mechanisms were discussed more fully in chapter one.

Little if any consideration has been given to the time course of human interference phenomena. However, a careful observation of the studies cited suggests that in contrast to the animal findings, the treatment effects are usually subsiding by the end of the test task.[1] In the human experiments, most of the uncontrollable subjects eventually learn to shuttle or solve anagrams in the post test. The last experiment discussed in the previous section is an example. Unfortunately, the published accounts of the human studies fail to give either the individual distributions of responding or data on the time course of performance on the post test.

One point that these considerations raise is the ignored question of just what effect are we involved with

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1. Information on this point is also important with respect to the ethics of using human subjects for LH experimentation. This issue has received scant attention

in humans?

Writers, without exception, talk of showing LH effects or learned helplessness in human subjects. But, from the previous discussion of the animal literature, it was concluded that this sort of statement was untenable on three grounds. Firstly, it confounds the effects with the mechanism that is proposed to account for them. Secondly, there are now known to be more than one type of interference effect, with each having differing etiologies and characteristics. Thirdly, as just discussed, interference phenomena include motivational, cognitive, and emotional aspects. Commonly, only one of these is demonstrated in any one study.

We come back to the question. What is the nature of the interference effect demonstrated in man?

On the basis of the evidence outlined in the cognitive section, it appears that the mechanism involved in producing the interference effects in man is that proposed by LH theory. Why the duration of these effects are so short-lived in man is an unanswered question. It could be a function of the shorter training periods involved in the human studies? It could be that the more complex conceptual apparatus of man allows him to conceptually isolate the experience and bring information from a variety of past experiences to bear on it - quickly neutralizing the helplessness cognitive set? It may even be that the majority of animal studies were looking at effects mediated by a mechanism other than learned helplessness, as some writers (e.g. Levis, 1976) suggest?

Generalization

In the context of a discussion of the generalization issue in human LH studies, Wortman and Brehm (1975) comment:

> An interesting feature of helplessness is that it can involve inappropriate generalization from a situation in which an organism does not have control to one in which it does. (p 305)

This is so. However, it understates the position. Not only is it interesting that it can involve inappropriate generalization, for a behavioural deficit to be considered an instance of interference, it must be demonstrated that such an inappropriate generalization has been made. In the original dog studies, for example, the dogs received inescapable shocks in a Pavlovian hammock and were then tested in a quite separate situation (a shuttle box).

In contrast to this, the separateness of the test situation from the pretreatment phase in human studies is not so clear cut. In paticular, it is doubtful whether a subject presented with a similar task to that which he had received during pretreatment, in the same experimental room, by the same experimenter, and as a part of the same experiment, is in a separate situation in the same sense that the dog in the shuttle box is. Is it inappropriate to generalize an expectation of no control from a task that you were told you could master and yet failed after repeated efforts, to a similar task presented to you by the same experimenter? If it is not, and admittedly this is partly a matter of semantics, then the experimental basis on which the claim has been made for the demonstration of interference in humans is undermined. The majority of experiments are of this very nature. Refer to Table 1. This table has been compiled by the author from what he believes to be an exhaustive review of the relevant literature up to November, 1976.

Notwithstanding what has been said above, it has been claimed on the basis of these experiments that not only has interference been clearly established but, that it has sufficient generality across both time and situations to be considered to have trait-like properties. Hiroto and Seligman (1975) claim:

> The process engendered debilitates performance well beyond the conditions under which it was first trained. (p 327)

In this paticular instance, the bases for this claim were the results of their five experiments contained in the same paper. These involved demonstrating that interference effects will transfer from a cognitive task to an instrumental task and vice versa. A fuller account

TABLE 1

The nature of the post test in relation to the pretreatment task and experimental outcome.

Experimenters	Post test in relation to pretreatment					Outcome
	Task	At same table	Same Room	Same Exptr.	Sep. Expt & Exptr.	
Fosco & Geer (1971)	SA	X	X	X	O	I?
Thornton & Jacobs (1971)	SA	O	O	X	O	I?
Thornton & Jacobs (1972) (2 expts.)	VDI	O	X	X	O	F?
	VDI	O	X	X	O	F?
Hiroto (1974)	SI	O	X	X	O	I?
Krantz et al (1974) (2 expts)	SI	X	X	X	O	I?
	SI	X	X	X	O	I?
Hiroto & Seligman (1975) (5 expts)	SI	O	X	X	O	I
	DI	O	X	X	O	I
	DI	O	X	X	O	I
	SI	O	X	X	O	ns
	SI	O	X	X	O	I
Roth & Bootzin (1974)	SI	O	O	O	X	F
Glass et al (1973)	DI	O	X	X	O	I?
Miller & Seligman (1975)	DI	O	X	X	O	I
Klein et al (1976)	SI	O	X	X	O	I
Klein & Seligman (1976)	SI	O	X	X	O	I
Gatchel & Proctor (1976)	DI	O	X	X	O	I
Wortman et al (1976)*	SA	O	X	X	X	F?
Bensen & Kennelly (1976)	SI	O	X	X	O	I
Roth & Kubal (1975)	SI	O	O	O	X	I/F
Sherrod & Downs (1974)	SI	O	O	O	X	I

Key: Tasks: SA same; SI similar; DI different; VDI very different

X this applies; O this does not apply

I interference; I? possibly I; F facilitation; F? possibly F

*expt. gave tasks to ss in both exptl. contexts.

of these experiments was given in the motivation section.

Are these tasks as different as Seligman and his coworkers believe? Clearly they are all problem-solving tasks. More importantly, they are embedded in the same experimental situation. Within these constraints they do provide evidence of a transfer from one type of task to another. This is interesting in its own right but hardly evidence for the claim that the effect generalizes "well beyond the conditions under which it was first trained". To talk of generalization within such constraints is really only talk of pseudo generalization. It is all contained in the one narrow experimental situation.

It has been argued by Roth and Bootzin (1974) that to demonstrate "helplessness" in humans analogous to that shown in animals requires that the post test be presented as a very distinct situation. In their own experiment, the post test took place in what the subject was induced to believe was a separate experiment with the testing conducted by a different experimenter. Of the four experiments that have done this (refer to Table 1), only two, Sherrod and Downs (1974) and Roth and Kubal (1975), have obtained an interference effect. If we accept Roth and Bootzins' criteria, the data base on which to assert that interference has been demonstrated in man is slim indeed.

From these considerations, it is clear that Hiroto and Seligmans' (1975) claim for a trait-like interference effect in man is premature. The trait concept implies rather extensive generality across both time and situations. In the last section it was noted that human interference phenomena are characterized by their ephemeral quality. Here we have noted that the evidence is not yet sufficient to say how wide the effects noted in the laboratory generalize. Indeed, there is some doubt as to whether the effects outlined in the now extensive literature are bona fide interference phenomena. This situation could be clarified somewhat, if it was demonstrated that the types of pretreatment typically employed here are equally effective in inducing impairment in a post test embedded in different context (e.g. part of a separate experiment), as they are in inducing impairment in post tests that are part of the same experiment.

THE WIDER DEFINITION

The broadest definition of learned helplessness embraces both the effects of uncontrollable positive events and extinction. Both are presumed to produce an interference effect.

Extinction has been discussed in the section relating LH theory to depression. An account of some of the effects associated with extinction in man is contained in Klinger (1975). From his account it appears that following the loss of an important source of positive reinforcement, individuals frequently go through the following cycle. First there is an envigoration/frustration phase where an attempt is made to regain the loss and exert control on the environment. If this is unsuccessful in regaining the loss, an inactive, quiescent phase follows. Usually this is of short duration and is followed by a recovery phase where the individual takes up normal activities again. How the quiescent phase in this schema is related to LH interference is uncertain - they may or may not be the same phenomenon. The envigoration part of the cycle is of interest in the light of the LH studies that have shown a facilitation effect (see Table 1).

Seligman (1975b) asserts:

> I am claiming, then, that not only trauma occuring independently of response, but noncontingent positive events, can produce helplessness...(p 98)

This is a fascinating possibility. In his more informal writings Seligman refers to it as the "spoilt brat" effect. What is the evidence for it at the human level?

Apart from anecdotal material, the evidence is thin. At the anecdotal level, for example, can be cited the "success depressions" - instances where people find themselves in a situation where they suddenly have many of the things they have been striving for, arriving independently of their <u>current</u> behaviour.

At the experimental level, Maier and Seligman (1976) cite some of the experiments mentioned earlier, where unsoluble discrimination problems were used in the pretreatment, as evidence that non traumatic uncontrollable outcomes can produce interference. However, the pretreatment involved both positive and negative outcomes (i.e. "correct" and "incorrect") being made noncontingent to the subject's responding. Thus, although an interesting extension of experimental methodology to produce interference (qualifed of course by the conclusions of the previous section), this is not a test of the assertion in question.

To date, only one experiment with humans has been conducted to test the noncontingent positive reinforcement hypothesis. Bensen and Kennelly (1976) used the same pretreatment task as Hiroto and Seligmans' (1975) cognitive pretreatment experiments. They also used the same design and experimental procedure except for the addition of a group that received only noncontingent positive reinforcement. It was found that both this group and the group that received both negative and positive reinforcement noncontingently, perceived that they were not in control and that it was due to their lack of skill. However, only the latter group showed evidence of the interference effect on the anagrams task.

To conclude, the sequelae of extinction may be related to interference phenomena. They may even be the same phenomena. In contrast, the only investigation of the effects of uncontrollable positive reinforcement has failed to find an interference effect.

DEPRESSION

In the review of the animal LH literature, it was shown that a number of parallels have been demonstrated between interference phenomena and human depressions, partly supporting the claim that LH provides a laboratory model of depression in man. The experiments already reviewed in this chapter indicate that associated with the interference effect in humans is the tendency for subjects to rate themselves as feeling more depressed, helpless, hopeless, not in control, anxious, and frustrated. All of these are adjectives depressed people typically use to describe themselves (see, e.g. Beck, 1962; Lubin, 1965).

Additionally, Miller and Seligman (1973) have provided evidence for the LH postulate that depression is characterized by the perception that reinforcement is independent of voluntary responding - i.e. the same mechanism proposed to underlie the LH interference effect. This was replicated by Miller et al (1975) who further showed that this cognitive distortion is specific to depression; anxiety did not produce the same effect. Another paper mentioned earlier was by Gatchel and Proctor (1976). These researchers showed that physiological changes accompanying the production of interference effects are also characteristic of depressed states.

Because interference effects can now be produced in human subjects, another strategy to test the LH model for depression is available. Depressed and nondepressed subjects can be included within the same experiment and exposed to the three treatments typically employed in the LH triadic design. This allows a direct comparison between the deficits of normal subjects who are induced to manifest interference and depressed subjects who have not received pretreatment.

Several experiments have recently used this strategy. The first of these showed that nondepressed subjects exposed to inescapable noise evidenced parallel deficits on an anagrams post test to depressed subjects who did not receive pretreatment (Miller & Seligman, 1975). This has subsequently been replicated by Klein and Seligman (1976) using the same pretreatment and an Hiroto-type shuttle box as the test task. Miller and Seligman (1976) replicated the earlier finding that depressives perceive their voluntary responding and outcomes of behaviour to be independent and showed that this cognitive distortion is also characteristic of non-depressives who have been exposed to inescapable noise. Klein et al (1976) replicated the findings of Miller and Seligman (1975) and Klein and Seligman (1976) and made two additional discoveries. 1. Non-depressed subjects exposed to uncontrollable noise only showed the interference effect if they attributed their failure to their own incompetence. 2. Interference deficits could be reversed in depressed and "helpless" subjects by informing them that their performance on the pretreatment task was due to the harshness of the environment rather than their efforts.

Finally, Klein and Seligman (1976), in their second experiment, found that by providing "therapy" (i.e. experience with soluble discrimination problems) they reversed the escape deficits and perceptions of response-reinforcement independence associated with both inescapability and depression.

These studies strongly support the LH model of depression: laboratory-induced interference has been shown to produce a number of symptoms parallel to those of naturally occuring depression. One study shows that both states can be alleviated by the same "treatment". However, this work shows that to improve the validity and precision of LH theory as a predictive framework, the extra construct of the attribution of uncontrollability to personal failure is required. Additionally, the wider claim for it being a model of 'real life' depression rests partly on the generality of the interference effect - something that has yet to be clearly demonstrated.

ADDITIONAL SITUATIONAL DETERMINANTS

With respect to the narrower definition of learned helplessness involving noncontingent aversive events, the review of the human literature strongly suggests that motivational and cognitive interference effects have been demonstrated. This is provided that the degree of generalization demonstrated is considered sufficient to warrant this label. On this issue there is considerable doubt. Further, it has been demonstrated that interference phenomena (if they are accepted as such) are accompanied by the expectation that responding and outcome are independent. This finding supports the claim that interference phenomena are mediated by the learned helplessness mechanism.

However, there are some discrepant findings and additional evidence that suggests a need to qualify the original LH formulations. Additionally, it is evident that there is a large amount of 'noise' even when the effect is obtained. I.E., there is a considerable lack of fit between Seligman's operational definition of learned helplessness and the observed interference phenomena.

This last point was raised earlier in the theory section. However, the situation with respect to the human findings is even more apparent than in the animal work. For example, in the early dog experiments, it was found that 37% of the dogs pretreated with noncontingent shocks <u>did</u> learn to escape. In contrast to this, 66% of Hiroto's "helpless" human subjects learnt to escape. Additionally, in the human experiments, the effect is often obtained on only some of the dependent variables. Unfortunately a great deal of vital information has been lost because the published studies do not contain either the individual distributions or the relative sizes of the ANOVA variance components. The impression is however, that very large amounts of "error" variance are common.

Besides these considerations, it was noted earlier that in some of the studies where the procedural requirements posited by LH theory were met, a significantly <u>enhanced</u> performance was obtained in the post test. These studies are summarized in Table 1. An additional relevant study is found in Glass and Singer (1972, pp 122-130).

Clearly there is a need to tighten up the LH model and improve the correspondence between the procedural definition and the dependent variable outcome. The logical approach to this task is to identify other variables that appear to help mediate the interference effects. Once they are identified, it may be possible to build them into a more comprehensive model with greater predictive power than the current formulation.

From the literature reviewed, what are these variables?

The most obvious answer is that they are to be found in individual differences brought into the experimental situation. Indeed, this is the explanation that Seligman gave to account for 'immunity' in 37% of the experimental dogs. This is considered to be an important area to investigate and it will be examined in the next two chapters. For the moment however, the focus will be on factors in the experimental situation per se.

One factor that could be expected a priori to be important is the difference between the pretreatment and post test situations. This was mentioned in connection with the generalization issue. When the post test was either very different from the pretreatment task, or embedded in a separate context, it was shown that the results were less frequently in favour of LH predictions.

Another rather obvious factor that the experiments reviewed indicate to be of some importance in determining whether or not an effect is obtained is the amount of exposure to the no-control situation. Fosco and Geer (1971), Krantz et al (1974), Hiroto and Seligman (1975), and Roth and Kubal (1975) all showed that an increase in the amount of helplessness training resulted in an increase in obtained effect. For example, Krantz et al found that one group of subjects in their first experiment showed only a small difference from controls. However, in their second experiment they gave a similar group uncontrollability experience on two separate tasks instead of the one in the first experiment. On this occasion, the effect was enhanced considerably - 66% of the subjects actually stopped attempting to escape in the post test.

Roth and Kubals' (1975) experiment is of interest for two other reasons. The first is that it showed that low levels of helplessness training induced a facilitation of responding. This is of interest in the light of Klinger's (1974, 1975) reported observation that the initial stages of extinction are marked by an envigoration phase - an attempt to reassert control over the environment. The second was their finding that of the two groups of subjects receiving higher levels of uncontrollability, the group that was working on the pretreatment task that was important to them, was more impaired at post test than the group that worked at a task of lesser importance.

A further factor implicated in a few experiments is the assignment of causality. When a person perceives that his behaviour and outcomes are independent, this can be for one of two major reasons. First, the individual can consider himself to be incompetent to succeed at the task in question. Alternately, he may attribute the reason for his failure to the nature of the experimental situation. LH theory makes no distinction between these two; it considers the perception of noncontingency to be the necessary and sufficient cause for LH-type interference.

Discussed in the emotionality section of this chapter were two very recent experiments, namely: Wortman et al (1976) and Klein et al (1976). These experiments indicate that it is only the first of the two attributions mentioned above that result in interference and, it would seem, facilitation.

Attributions of this nature may be very important in accounting for much of the weakness in predictive power of LH formulations. For example, Wortman et al found that of the three groups exposed to helplessness training in their experiment, the group attributing causality to the experimental situation was the least affected. The group that attributed causality to lack of ability was most affected. Inbetween these two, on most of the dependent variable measures, was the group that was not given information to induce either of these attributions. As the authors commented, this latter group may be considered representative of subjects in experiments where attributions are not manipulated. In the light of this, it is of interest that Krantz et al (1974) found from a post questionnaire administered to their inescapable subjects, that sixty percent considered they themselves were responsible for failure - forty percent that it was the situation responsible. They did not say if the latter failed to show interference in the post test. One would suspect so. It has yet to be firmly established but, from the above considerations, it appears that the addition of the attribution variable to the LH position would greatly enhance the fit of theory to observation.

SUMMARY

There are a number of parallels between the human and animal literatures. Both began with attempts to demonstrate interference effects similar to those found in the early dog experiments. Later, both became concerned with showing parallels between interference phenomena and depression. Some work has been conducted in both fields to investigate the claim that it is uncontrollability per se rather than uncontrollable aversive outcomes that produces LH effects. Although different methods have been used to induce interference in man, and although the transient nature of human interference raises the question of how exactly it relates to the animal findings, the human work does provide some support for LH hypotheses in relation to man.

Ostensibly, more work has been done on the generalization of interference across situations, in the human literature. However, it has been argued that this has in the main been a misdirected concern with 'pseudo generalization'.

Although there are a number of commonalities between the two literatures, it is also evident that there are a number of important factors involved at the human level that are not applicable to interference in animals, for example, attributional factors. Consequently, there is a need to consider the human findings separately and attempt to build these additional factors into our theoretical frameworks.

CHAPTER IV. EXTENSION OF LEARNED HELPLESSNESS THEORY

INTRODUCTION

LH theory was developed to account for phenomena observed in subhuman species. At this level, although the model has serious shortcomings, it does a reasonable job of accounting for a fairly high percentage of the experimental data and in generating experimentation over a wide front. However, with the extension of experimentation to humans, although the LH mechanism has been shown to be more definitely involved than it has at the animal level (and in this sense it is a more valid model for human interference effects) the predictive power of this formulation has been shown to be lower with humans. To account for the greater complexity at the human level, it seems that a number of additional mediational constructs need to be considered.

AN EXTENDED LH STATE MODEL

Recently, working on the basis of some of the data just discussed (i.e. in the latter part of Chapter III), Wortman and Brehm (1975) developed a more complex model by combining Reactance Theory with LH formulations. This model includes some of the variables that have been identified as important, namely, importance of outcome, amount of helplessness training, and an additional one - expectations of control. Apart from including these variables, the model has the additional advantage over LH theory in that it predicts that under some conditions, a facilitation effect (reactance) will be obtained.

For a fuller account of their position, the reader is referred to the original work. In summary however, their position is thus. If an individual expects to be able to exert control over an outcome that is important to him, it is hypothesized that a small amount of helplessness training will threaten his freedom and stimulate him to perform better. On the other hand, a large amount of helplessness training will change his expectations of control and produce interference phenomena.

This postulation of a curvilinear relationship between amount of helplessness training and performance parallels work in the field of anxiety and its relationship to performance. Much of the anxiety literature supports the Yerkes-Dobson Law, the very general expression which posits an inverted-U function between efficiency of task performance and drive or arousal level. A review of current literature is contained in Eysenck (1973), pp 363- 365.

To date, no published work has specifically been designed to test Wortman & Brehms' more elaborate theoretical structure, although Roth and Kubals' (1975) experiment provides some support for it. One obvious shortcoming of the model is that it lacks reference to attributions of causality. The model therefore requires qualification - i.e., it may only hold when subjects attribute lack of control to their own inadequacies? Future LH human research will be more illuminating if conducted with reference to the variables specified in this extended framework.

ORGANISMIC DETERMINANTS

The discussion above has isolated situational factors that appear to be important in determining whether or not the interference effect will be manifested in a given situation. However, as Mischel states:

> We may predict best if we know what each situation means to the individual, and consider the interaction of the person and the setting, rather than concentrating either on the situation itself or on the individual in an environmental and social vacuum. (1971, p 149)

In other words, the behavioural outcome is a joint consequence of both situational determinants and more persistent characteristics that the subject brings into the situation.

Thus, the other approach required to supplement the model outlined above and reduce further the lack of fit between theory and observed outcome, is the focus on characteristics of the individual that are likely to make him more or less prone to interference effects when placed in a situation of no control. As mentioned, this was the approach Seligman advocated in connection with the early dog studies. At the animal level, a little work has been done in seeking out these characteristics, for example, the immunization and developmental studies.

Within the human LH literature, organismic variables have been largely ignored. A perusal of the twenty-five or so relevant human experiments indicates that only three have included trait variables. Additionally, with the exception of the experiments that included depressed subjects, four did not state the sex of the subjects used, five used subjects of one sex only, and the remainder used both sexes but, in only one case did a separate analysis for the two. Adding this study to the six depression studies that did consider sex, three found sex main effects and the remaining four found no effects. None indicated interactions.

This neglect of organismic variables is not unique to this field. It is typical of present day experimental psychology in general and has been lamented upon at length by Bowers (1973). Indeed, it is even characteristic of personality research as Carlson (1971) notes in his appropriately titled paper, "Where is the person in personality research?". In this paper it was noted that although only a small percentage of sampled studies compared sexes, of those that did, 74 percent found sex to be a significant factor.

Although this neglect of organismic variables in learned helplessness research is understandable in terms of the more general climate in psychology, it is somewhat surprising considering the cognitive nature of LH theory.[1] Cognitive theories are virtually intrinsically interactionist. This is because they are concerned with conceptions or constructs - interpretations of current environmental stimuli in terms of cognitive frameworks built up through past experience (e.g. Kelly, 1955).

With these considerations in mind, it would follow that the logical approach to the task of improving the LH model would be to identify organismic variables that appear to be of relevance to the cognitive factors isolated in the previous section and included in the integrated model. Both sets of factors could then be varied in factorial designs with interest focussed upon the interaction effects as well as the main effects. This, however, is for the future. A small start has been made with a few relevant studies, although they were not designed with this enterprise in mind.

Locus of Control

Hiroto's (1974) study has been described in part and discussed at other points in this thesis. In the present context it is of interest because of the inclusion within the design of the personality construct locus of

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1. Additionally, the early LH writings, e.g. Overmeir, Seligman, and Solomon (1969), expressed the need to consider the possibility of lasting traits of helplessness and mastery, and the need for related developmental studies.

control. Rotter (1966) suggested that people distribute along the dimension of locus of control with internals tending to perceive reinforcements as under their control and externals tending to perceive reinforcements as not being under their control. It was noted by Seligman et al (1968) and Hiroto (1974) that this construct has similarity to learned helplessness in that individuals exposed to uncontrollable outcomes typically develop the expectation that reinforcements are independent of their behaviour. This state is clearly similar in this sense to the more generalized trait of Externality which is characterized by the same expectancy. These considerations will be amplified shortly.

Hiroto's full experimental design was a 3 (inescapable noise vs. escapable noise vs. no noise) x 2 (Internal vs. External) x 2 (chance set vs. skill set) factorial combination. The more general findings were that Externality, chance set, and inescapability all retarded escape-avoidance behaviour. On this basis, he concluded that since the common factor in these conditions was presumed to be the independence of responding and outcomes, then this was very likely to be responsible for producing the interference effects.

Of more interest in the present context was the further finding that in addition to the locus of control main effect (i.e. Externals impaired in all experimental conditions), there was an interaction on one of the dependent variables (response latency). The interaction indicated that within the inescapable group, Externals were more impaired than Internals. It is of interest to consider this in relation to the additional finding that during exposure to inescapable noise in the pretreatment phase, the Internal group made significantly more attempts to control the noise. This suggests a similarity to Seligman's concept of immunization, where dogs with prior experience of escapable shock displayed enhanced panel pressing when exposed to inescapable shock. At post testing they were not characterized by interference phenomena. This point will be taken up again.

Miller and Seligman (1973) designed an experiment to test the hypothesis that the mechanism postulated by LH theory to account for interference was also characteristic of both depressed and External college students. They argued that because depressives and externals are supposed to perceive reinforcement as more response independent than nondepressives, these two groups should show less change in their expectancies for success on future trials when exposed to contingent reinforcement on a laboratory task. As noted earlier, this was shown for depressives. It has subsequently been replicated and also shown to characterize individuals previously exposed to inescapable noise. However, Miller and Seligman found that this retardation of expectancy shift was not characteristic of their Externals.

Thus, although this experiment does not look at the interaction of locus of control and helplessness training as Hiroto's does, it does question the mechanism by which locus of control could be presumed to operate in producing differential responses to uncontrollable aversive stimuli.

Miller and Seligman considered that the discrepancy between their hypothesis and the obtained results was probably due to the scale used being an inadequate measure of the Internal-External (I-E) construct. It is worth noting however, that Hiroto used a different I-E scale and employed extreme groups rather than Miller and Seligmans' median split. Notwithstanding, there does appear to be an inconsistency here.

Sex

Hiroto did not conduct a separate analysis for sex of subjects. Miller and Seligman did and obtained a significant main effect due to sex. Males exhibited greater expectancy change than females following reinforcement. Miller and Seligman (1976) noted also that females had lower initial expectancies for success on the skill task. In both instances, these findings were simply mentioned in passing. Potentially however, they could be important. The earlier Miller and Seligman experiment also found complex interactions between Externality, sex, and tasks on several ANOVAs. Unfortunately, the authors failed to specify what they were.

Although sex differences have received virtually no comment in connection with learned helplessness, sex differences have commonly been found in other areas of experimentation that could have an important bearing on the extended LH model outlined in the previous section.

Consistent with Miller and Seligmans' results are the findings of Feather (1969) and Crandall (1969). They have shown that males have a higher expectancy of success than females over a wide range of skill and achievement-type tasks. Furthermore, Battle (1965) has indicated that greater expectancies may lead to greater persistence on skill tasks. There is also evidence that females have lower reward values for tasks that are either perceived or designated as masculine. The reverse holds for males. See Stein, Pohly, and Mueller (1971). Daeux et al (1975), from a review of the relevant literature, found that this difference in initial expectancy for success did not hold on tasks where results are determined by chance.

Dweck and Reppucci (1973) found that children who had experienced failure with a block design task were more persistent on a subsequent similar task when they attributed their previous failure to a lack of effort. This finding relates directly to LH formulations. Additionally, they found this difference to characterize males vs. females, with males tending to attribute failure to lack of effort.

Other Factors

Although a number of trait factors could be postulated to be of significance to learned helplessness, for example achievement motivation, only one other study in the LH literature has considered the interaction of trait variables with LH interference phenomena. Krantz et al (1974) noted the observation of Engel (1968) that physical disease is often preceded by a state of helplessness and Greene et al (1972) who, with a more specific focus, provided some evidence for this contention with respect to males who suddenly died from coronary disease.

Krantz et al were interested in trait factors that may predispose an individual to this type of "helplessness". They built what they considered to be a laboratory model of the phenomenon by using the LH paradigm in connection with Friedman and Rosenmans' construct of the "coronary prone behaviour pattern" (Rosenman et al.,1966). People characterized by this pattern have a life style that is typified by a strong sense of time-urgency, hard driving competitiveness, and a preoccupation with vocational and related deadlines. Individuals so described are labelled Type A; those who have the pattern to a lesser degree, Type B.

Krantz and his coworkers hypothesized that Type A suggests a person who is consistently striving to avoid loss of control over his environment. Thus, helplessness training should elicit considerable striving and attempts to regain control (reactance?) in this type of person.

Eventually however, this person will give up attempts to control the stressor and become "helpless". In contrast, Type B's were expected to experience these same effects but to a lesser degree.

Also varied in their design was the intensity of the stress received. Although not predicted by the authors, an interaction between personality and stress level was found. Type A subjects attempted to escape from moderate stress whereas Type B subjects were impaired. With high levels of stress, the situation was reversed.

Amount of stress is not an element in the original LH model and it was not found to be important in the earlier experiment in Krantz et als' paper. It only became significant in relation to organismic variables. As the authors commented on their findings:

> We concluded earlier that stress arousal was not a requirement for producing interference effects. It now appears that individual differences places a qualification on this generalization. (p 298)

This underlines the point made earlier. The experimental data at the human level are too diverse to be contained adequately by the original LH formulation. On the other hand, to haphazardly relate multitudes of individual difference variables to LH phenomena would create confusion. The approach favoured here is the systematic relating of trait variables such as the ones outlined, to the cognitive elements of the expanded LH model outlined earlier. Although trait variables have not previously been considered in relation to Wortman and Brehms' framework, it appears to be ideally suited for that purpose.

TRAIT VARIABLES AND THE EXTENDED MODEL

This section is concerned with providing a few illustrations of the way in which organismic variables from the experiments just outlined, can be combined with the extended LH state model to increase predictive power and provide for more ordered research and coherent theory building.

Krantz et als' paper is interesting but difficult to interpret in terms of the extended model because there are no no-treatment control groups included within their design. This makes it difficult to say whether reactance and/or interference actually occurred. It is known however that the coronary prone trait variable interacted with the situational factor of stress level. The result of this interaction could probably best be subsumed within the extended model by conceptualizing it as influencing the importance of outcome variable. It is also possible that the trait factor had a direct influence on expectancy of control as well.

Of more direct relevance to this thesis are the two factors of sex and locus of control. From the studies reviewed, how would we expect these two trait variables to impinge upon the extended LH model?

Sex factors could probably influence all of the major variables in the extended LH model. Most importantly, initial differences in the expectation of control over outcomes has been demonstrated. As predicted by the extended model, such differences are presumed to determine how much an individual will persist in trying to exert control in the face of uncontrollability. Males would be expected from this consideration to demonstrate more reactance when confronted with uncontrollable outcomes on a skill task. Females, on the other hand, would be expected to manifest less reactance and more quickly display interference effects. However, this would depend very much on the task chosen for pretreatment. Tasks that are obviously male sex-typed would be expected to enhance this difference on the post test.

Male sex-typed tasks could exaggerate sex differences in performance by either changing expectancies of control and/or by modifying the importance of controlling the outcome (ego-involvement in traditional terminology). These are all testable hypotheses and although not tested in the LH literature, other areas of psychology contain experiments that lend support to the validity of the suggestions made here.

The other major variable that sex differences could be expected in is attribution of causality. This is a little studied area to date although Dweck and Reppucci

(1973) and Dweck (1975) have demonstrated differences in the way girls and boys attribute success and failure in skill tasks and indicated that this relates to persistence. On this variable too, the little evidence to date suggests that females would be less likely to demonstrate reactance, and more likely to become "helpless", after fewer helplessness training trials than males.

Thus, although sex factors have largely been ignored in connection with LH research, from the above considerations of the way in which sex differences could interact with variables in the extended LH framework, it would appear that they could be of importance. This may be particularly so when other trait factors are also considered in relation to interference phenomena.

On theoretical grounds, locus of control would be expected to be of major importance in accounting for individual differences in response to exposure to uncontrollable outcomes. Internals should have higher expectancies of control over the aversive stimulus during pretesting. Consequently, they should show more reactance during the initial phases of pretreatment and be less prone to the development of interference. In the case of externals, the reverse would be expected. Although it is likely that the main effect of this personality construct would be through modifying control expectations, it is possible that it may influence other variables in the extended State LH model. This will be considered after the literature on locus of control has been reviewed.

STATE AND TRAIT HELPLESSNESS

Within the field of personality theory and research, the distinction is increasingly being made between states and traits. States refer to the here and now, e.g. "Mr Jones is anxious now". In contrast to this, traits refer to a lowered threshold for experiencing a particular state, e.g. "Mr Jones is the sort of person who has a tendency to become anxious". Research with respect to these formulations typically focusses upon the interactions between personality traits or predispositions and situational factors that give rise to states.

This type of conceptualization reflects a growing reapproachment between two previously conflicting traditions within psychology. Traditional personality theorists emphasized traits and sought to show transituational consistency (e.g. Cattell, 1950, 1960; Guilford, 1959). S-R 'theorists' of the Watsonian and latterly Skinnerian tradition have sought exclusively situational determinants of behaviour. In essence, this division goes back to the nature-nurture debate of antiquity.

The traditional trait position has been discredited as a viable predictive framework. Mischel (1968) shows that cross-situational correlations rarely exceed .30. Increasingly, the situationalist position has become the dominant paradigm - reflecting the environmentalist traditions of present day psychology. Indeed, as the Sociologists of Knowledge have it, reflecting the democratic-egalitarian traditions of Twentieth century America. The S-R position has been enormously productive in terms of both research and increasingly applied, particularly clinical,applications.

In spite of the apparent power of the S-R position, whenever comparisons of the amount of variance in self ratings, self report, or actual behaviours attributable to person and situational variables are made, it is seldom that either account for large amounts of variance. In a study by Bowers (1973) which sampled a large number of such comparisons, the mean variance due to persons was 12.71%, that due to situations 10.17%, and that due to interactions was 20.77%. The message here is self evident.

In the area of anxiety, the state-trait interactionist position has been particularly fertile. The dominant conceptualization has been that of Spielberger (1966, 1972). For another account, see Ekehammer et al (1974).

Spielberger distinguishes between A-state, which refers to the actual feelings of tension and automatic arousal experienced in response to threat and A-trait, which refers to the tendency of individuals to respond with A-state elevations in situations which are perceived as potentially threatening to self esteem. The higher the A-trait level, the greater the perceived threat in such situations, and the greater the A-state reaction.

Apart from stimulating an enormous amount of research in recent years (Smith & Lay, 1974, provide a comprehensive annotated bibliography), the model has clinical relevance. For example, although Behaviour Modification approaches (one spin-off from S-R theory) have been very successful in the treatment of anxiety-related neurotic disorders, they have had only limited success with the so-called polysymptomatic neurotics - a clinical group that includes agoraphobics (Bergin & Garfield, 1971, pp 572-573). It appears that this is because although the treatments generated by S-R theory reliably reduce anxiety states, they are not as viable with anxiety traits - an important characteristic of polysymptomatic neurotics. For this group, it is necessary to change their predisposition to experience anxiety. This probably requires techniques from outside of the Behaviourist's traditional therapeutic armoury. Abbott (1975) for example, has argued along both theoretical and empirical lines that certain types of meditation are of value here.

In marked contrast to this very fertile area of theory and practice, the other major psychopathological mood disturbance, depression, has until recently been very much the poor relation. However, as noted in the introduction, the situation has recently begun to change with the advent of LH theory and a number of S-R models and therapies. As they stand however, these positions are all situational in focus. Although fertile, they lack the breadth of the theoretical constructions in the anxiety field because they do not link with any related trait conceptions.

This is not surprising considering the state of organismic research within this field. The situation has recently been lamented in a recent U.S.A. National Institute of Mental Health Report by Secunda et al (1973). They urgently recommended "intensive research on the depressive personality" (p 41). Such research has not been forthcoming. To date, the major work in this field has been psychodynamic. It currently consists of a number of speculative and predominantly unsubstantiated propositions. The situation is summed up by Chodoff (1974):

> An examination of the relevant literature ....makes it clear that we are very far from consensus about the characteristics of such a putative personality pattern predisposing to depression. The issue is an important one for the understanding and treatment of depressive illnesses... .(p 55)

It would be expected that such predisposing characteristics will be found to be diverse - reflecting the heterogeneity of depressive phenomena.

Although it is by no means clear at this time where the LH model of depression fits into the range of depressive disorders, the evidence reviewed in this thesis indicates that its claim to be a mechanism accounting for at least some of these phenomena is gaining increasing support. What is being proposed here is that within this area, the concept of locus of control may be able, on the basis of considerations to this point, to provide the sort of predisposing trait formulation that LH is likely to require to bring it to its fullest fruition as a model for depression.

The way in which locus of control could interelate with the extended LH framework has already been outlined. This conceptualization is analogous with the S-T anxiety model of Spielberger. Externals ('H-Trait') are hypothesized to have a lowered threshold for experiencing interference phenomena ('H-state') when confronted with uncontrollable outcomes that the individual thinks he should be able to control, that are important to him, and that are subsequently attributed to his own inadequacy rather than being seen as due to the way the environment is arranged. For the present, it seems probable that the lowered threshold of Externals is due to the lowering of generalized expectancies of control. However, it may also operate by feeding into the extended LH model at other points, for example, by changing the importance of an outcome or by modifying the way causation is attributed?

This formulation is proposed in the hope that it may help stimulate a more broadly based research thrust in the area of learned helplessness, one that has proven viable in the field of anxiety, one that is acknowledged to be needed in the study of depression, and one that is in keeping with recent trends within psychology.

It is not proposed that LH formulations will embrace all of the diverse depressive manifestations. Neither is it proposed that locus of control will be the only organismic variable of importance in modifying proneness and resistance to experiencing interference phenomena. However, the conceptual properties of the former suggest that it could be an important factor.

In the next chapter, the locus of control literature is selectively reviewed in the light of its proposed role in the state-trait (S-T) helplessness formulation. It should be noted that to date, the relationship postulated to hold between this construct and LH is somewhat tenuous. Although congruent with theoretical considerations, the position is speculative and in need of empirical research.

CHAPTER V. LOCUS OF CONTROL

INTRODUCTION

Not only is the locus of control literature a vast one, it is one that is continuing to expand at an ever more rapid rate. In 1975 Rotter commented:

> Estimates of the number of published articles dealing with some aspect of internal versus external control of reinforcement vary, but it is clear that there are well over 600 studies. (p 56)

Levinson and Miller (1976), just one year later, claim that there are over 1000 published studies. Additionally, these studies span a very wide range of subfields of present day psychology. A scanning of the literature, with the aid of general reviews (Rotter, 1966, 1972; Joe, 1971; Phares, 1973) indicates contributions from the following fields: personality, learning, developmental, social, political, cross cultural, environmental, sex differences, and a wide range of the clinical subfields.

Speculating on why this concept has become so popular, Rotter (1975) suggests that it must be related to the tremendous growth in population, increasing complexity of society, and the subsequent feelings of powerlessness that permeates the social fabric. Indeed, further thought along these lines indicates a relationship between locus of control and a range of constructs used by other social scientists who have been concerned with these broad social changes.

Marx, Weber, and Durkheim, in their concern for the impact of industrial society upon man and his social institutions, all had a central place for the concept of alientation - the feeling of being unable to control one's destiny. In more recent times, Merton (1949) has stressed the importance of this latter construct and its close relative, anomie, in the field of social pathology. Seeman (1959) talks of powerlessness.

Outside of the social sciences, the same theme has been a dominant one in twentieth century art and literature. Kafka, Orwell, and Huxley are names that stand out. It also relates to powerful social movements - the struggles of minority groups, woman's liberation, the student protest, and reactions within the professions - radical psychology and sociology, anti- and existential psychiatry.

Even excluding related areas in the social sciences and psychology, the size of the locus of control literature is still very expansive. The review that follows, on the other hand, makes no claim to be comprehensive. Rather, it is focussed on the possibility raised in the last chapter, that locus of control may provide the much needed trait conception to supplement the state construct of learned helplessness. Concern here is consequently directed toward evaluating this proposal. Part of this concern involves an identification of how locus of control could influence the variables in the extended LH model.

LITERATURE REVIEW

The Origin and Concept of Locus of Control

Rotter and his coworkers noted in the course of experimentation into changes in expectancies following reinforcement, that changes appeared to vary systematically depending upon both the nature of the task and the particular individual being reinforced. To help improve their predictions of how reinforcements changed expectancies, they became interested in developing a measure that would reflect these individual differences (see Rotter, 1966 for a review of this early work). The construct operationalized by the questionnaire developed for this purpose was termed the locus of control of reinforcement.

Locus of control, as it is now commonly termed, refers to a person's generalized expectancy about whether or not he has power over what happens to him. It is conceptualized as a continuum upon which individuals are normally distributed. One end is termed internal control, defined as "...the perception of positive and/or negative events being a consequence of one's own action and thereby under personal control" (Rotter et al, 1962, p 499). The other end is termed external control - "...the perception of positive and/or negative events being unrelated to one's own behaviours in certain situations and therefore being beyond personal control (op.cit.,loc. cit.)". Rotter claims that in Western cultures, external causation is attributed to either chance, luck, fate, or to powerful others, or to the complexity and hence, unpredictability, of the environment.

<u>Some Theoretical Considerations</u>

Although the vast majority of research relating to locus of control has been primarily concerned with the concept as a general personality trait, how this trait relates to other psychological constructs, and how well it predicts behaviour in a great diversity of situations, its origin was from within social learning theory, where its function was somewhat different. Within this framework, one which attempts to integrate S-R and cognitive/field theories, locus of control is but one behavioural determinant - a relatively unimportant one at that (see Rotter, 1975). This origin, and its place within this theoretical system, has been generally overlooked.

Within social learning theory (Rotter et al, 1972), expectancies are conceived as being only one of three major determinants of behaviour. The other two are the value of the reinforcement and the psychological situation. Additionally, locus of control is but one expectancy, a very broad one covering a wide range of situations. In any given situation, the expectancy of success and/or failure is a composite of information the individual has received from his current and past experiences with that situation, his experience with similar situations, and finally, his most broad expectancies about control over situations in general.

In outlining the above, the intention has not been to explain social learning theory. Rather, it has been to point out that locus of control was originally conceived as but one of a number of variables involved in predicting behaviour. Two points follow from this. First, locus of control was not developed as a precise predictor of behaviour in a given situation. It was intended to provide a low degree of prediction over a wide range of situations. For the former purpose, information is required on more precise expectancies in addition to information regarding other situational factors. Second, it follows that the more ambiguous the situation to an individual, the less more specific expectancies will be able to operate. Consequently, generalized expectancies will be relied upon more and, in this situation, locus of control would be expected to afford quite high predictive capacity.

These points have been made because researchers using locus of control have typically failed to take these additional factors into account. Situational factors have commonly been ignored, particularly reward value and ambiguity. Consequently, a degree of predictive ability has frequently been sought where locus of control per se would not be expected to provide this. Finally, the interactional model in which locus of control was originally located, is very similar to the extended LH model. It might be of interest to plug it back into such a model for the more specific purpose of understanding interference phenomena.

Measures of Locus of Control

The I-E Scale

Phares (1957) made the first attempt to measure generalized expectancies of control, in connection with his work on chance and skill effects on expectancies for reinforcement. A revision of this test by James (1957), the James-Phares Scale, has been used in some of the subsequent research on locus of control. Successive attempts were made to improve the psychometric properties of this measure. These efforts culminated in the I-E Control scale, a 29-item, forced-choice test including 6 filler items to increase ambiguity of the test's purpose. The items sample a wide range of situations in which I-E attitudes are expected to affect behaviour. For a full account of the development, validity, and reliability of this scale, see Rotter (1966).

In summary, Rotter's (1966) account indicates that the test has consistent and acceptable test-retest and internal consistency reliability. Good discriminant validity is reported, showing very low correlations with intelligence, social desirability, and political affiliation. Construct and criterion related validity were evidenced by the demonstration of predicted relationships between locus of control and both expectancy changes on a laboratory task and active efforts by tubercular patients to improve their condition. Two factor analyses both indicated one general factor accounting for the majority of the variance. Smaller factors loading on one or two items were also found but were not considered to be sufficiently reliable to indicate the need for the development of subscales.

The I-E Scale: Recent Empirical Findings

Reliability and correlations with intelligence have been consistent with the early findings. In contrast to Rotter's early work, social desirability correlations with the I-E Scale have been more variable. Like all questionnaires, it seems that the I-E Scale is subject to error in particular test situations. The scale's independence from ideological or political bias is also doubtful (Feather, 1967; Thomas, 1970).

Recent studies using the I-E Scale have found more complex factor structures than were found earlier (Gurin et al, 1969; Mirels, 1970; Lao, 1970; Collins, 1974). There are indications that these differences are due in part to changes in social attitudes since the scale was first developed and that these changes are also reflected in the change in the mean university student score from 8 (SD = 4) to between 10 and 12 (Rotter, 1975). This represents a trend over time in the external direction and it appears that the increased complexity of the scale reflects an increasing differentiation in attitudes, particularly among individuals scoring at the external end. However, the separate factors vary from population to population and generally intercorrelate quite highly.

Other Measures

Recently, a number of alternate I-E measures have been developed. For example, Schneider (1968), Dies (1968), and Adams-Webber (1969) have developed further adult tests, the latter two being projective devices. Scales have also been produced for testing children (Battle & Rotter, 1963; Bialer, 1961; Crandall et al, 1965; Mischell et al, 1974). The last two of these four children's tests are of interest because they provide separate scores for perceived control over positive and negative outcomes. Levenson et al (1973, 1974) have constructed separate scales for expectancy of control by self, by powerful others, and by chance, in an attempt to reflect the increased complexity of the external dimension. However, in most samples, these scales are relatively highly intercorrelated.

In summary, it would seem that for some specific purposes, e.g. expectancies of control over scholastic outcomes, more refined tests are required. However, for most general purposes, the I-E Control Scale is still the preferred instrument. Levenson et als' test may in the long run prove more valuable if different correlates of the separate scores can be established. As indicated in the theory section, this is what Rotter claimed from the start - more precise prediction requires more precise instrumentation.

Performance on Skill-Chance Tasks

The first attempt to measure individual differences in generalized locus of control was in connection with the study of chance and skill effects on expectancies of reinforcement. This early work (Phares, 1957; James, 1957) showed that Externals, placed in a skill situation, behaved similarly to the way all other subjects did when placed in a chance situation. They showed smaller changes in expectancy after success or failure and more unusual shifts (i.e. down after success, up after failure). In other words, they acted as predicted on the basis of their scores on the I-E Scale - as if they perceived reinforcements to be less contingent upon their behaviour than was in fact the case.

It should be noted however, that this relationship between locus of control and expectancy change has been of a low order in all studies. In some studies, although in the predicted direction, the relationship has not reached significance (Miller & Seligman, 1973). A further finding in these and other experiments has been that Externals persistently have lower initial expectancies of success in a variety of skill task situations (Nelson & Phares, 1971; Strassberg, 1973: Phares & Lamsell, 1974).

These differences in expectancy have been found to be reflected in behaviour. A general finding has been that when tasks are structured as ones in which the outcome is contingent upon the subject's performance, Internals typically work harder and longer. Their performance is also generally superior (Joe, 1971). However, there are some inconsistencies, for example Petzel and Gynther (1970). Additionally, with children, it appears that more precision is required in the assessment of expectancies before predictions can be made. For example, Mischel et al (1974) found that overall expectancies of control did not predict persistence on a variety of skill tasks. However, children's expectancies of control over positive outcomes predicted very well how persistent they would be at instrumental behaviour to attain rewards. Similarly, their expectancies of control of negative outcomes predicted their performance in avoiding negative consequences. To date, none of the adult measures distinguish between expectancies of control over positive and negative outcomes.

Passive and Defensive Externals

The position with respect to skill-chance performance is further complicated by the greater diversity of reactions in skill situations among externals than among internals.

Rotter noted in the earlier experiments that there were some externals who tended to be passive, as would be expected of individuals who saw what happened to them as being beyond their control, and others who appeared to be ambitious, aggressive, and competitive. This variability in the external group has also been observed in contexts other than skill tasks (e.g. Hersh & Scheibe, 1967; Phares & Lamiel, 1974). It is also more characteristic of male samples (Rotter, 1975). It was considered by Rotter that this diversity was a reflection of two relatively distinct groups that were external for different reasons.

Attempts to separate these groups by their patterns of responding on the I-E Scale were not successful, although, it may be that they are related to Levenson's Chance and Powerful Others Externals. If so, his scale may be of some value in separating them. Hochreich (1975) has recently suggested that it may be possible to separate them by using additional measures in combination with the I-E Scale.

It appears that the defensive externals, the label given to the more active group, use externality as a defence against failure. Failure is seen as being due to outside forces rather than their own inadequacy. In contrast to the passive group however, they still maintain striving behaviour in competitive situations. In other words, in some situations, they act like internals. Clearly, it is vital that more precise ways are developed for separating these two groups.

Achievement Motivation

Rotter (1965) proposed that internals, who feel that they have control over their environment, should display more active striving for achievement than externals. Studies by Franklin (1963), Efran (1967), Rotter and

Mulry (1965), Chance (1965), Crandall et al (1965), Crandall et al (1962), Gurin et al (1969), Lao (1970), Coleman et al (1966) and Hunt and Hardt (1969) support this position. A few studies have failed to find this relationship, for example, Eisenman and Platt (1968) and Hjelle (1970). However, the bulk of the evidence indicates that internals show greater interest and efforts in achievement-related activities than externals. Some studies have suggested that sex differences interact with this aspect of locus of control (e.g. Crandall et.al., 1962). Defensive externals have not been separated out in any of these studies. Presumably, if they had been, the differences between internals and externals would have been even greater. For the most recent comment on locus of control in relation to achievement motivation, see Feather and Simon (1976).

Control of the Environment

A large number of studies support the view that internals show more initiative in their attempts to realize goals and to control their environments than do externals (see Rotter, 1966; Joe, 1971; and Phares, 1973 for reviews).

Recently, this generalization has been shown to extend to attempts by individuals to control their own behaviour (e.g. weight reduction programmes) and their own internal functioning (e.g. taking contraceptive precautions and biofeedback training). For examples, see Johnston and Mayer (1974) and Wagner, et al (1974).

An exception to this has been found in the field of social-political activism. Early studies supported the view that internals would be more likely to engage in social action because they believe their behaviour would bring about the desired change. More recent studies however, have found either no relationship, or the reverse. A discussion of this literature and an explanation for the reversal is found in an article by Levenson and Miller (1976). It appears that external activists score as externals not because they believe that the world is controlled by fate or chance but because they see it as being controlled by powerful others. In terms of instrumental behaviour, the distinction is an important one. If the world is controlled by powerful others, there is a potential for change. If it is controlled by chance or fate, there is not. Rotter's scale does not make this distinction.

Attributions in Threat Situations

A number of studies have focussed on the attributions that externals and internals make in threat situations. From an attributional perspective, external control represents the attribution of causality to external sources, while internal control represents the attribution of causality to personal forces. Consistent with these general orientations, it has been demonstrated that following failure experiences, internals blame themselves, whereas externals blame the situation (Phares et.al.,1971; Phares, 1971; Davis & Davis, 1972). The two groups do not differ however in the way they attribute the causation of success (Davis & Davis, 1972; Carver, 1976).

Other research has found that when subjects are failed on ego-involving tasks (e.g. intelligence tests), externals subsequently devalue the tasks on which they are failed to a larger extent than internals do (Phares, 1971).

The above findings suggest that externality functions as a defence against failure-induced anxiety. This interpretation is consistent with other findings that show that externals forget fewer past failures and less negative information about their personalities (Lipp et.al.,1968; Efran, 1963; Phares et.al.,1968). From this, it appears that externals have less need to reject failure through repression or forgetting because they perceive the cause as external to themselves. Internals, on the other hand, would be expected to see the cause as residing in their own personalities. Studies that show internals characteristically use repression as a defence support this line of argument (Tolor & Reznikoff,1967; Altrocchi et.al., 1968).

Personality Correlates

A large number of studies have correlated I-E scores with subject's scores on personality inventories. Typically, internals describe themselves as more assertive, achieving, powerful, independent, effective, and industrious. They are also more socially skilled and show more insight into their own behaviour (Tolor & Reznikoff, 1967; Altrocchi et.al.,1968).

Externals indicate more hostility and aggression on pencil and paper tests (Williams & Vantress, 1969). This finding is consistent with the expectation that this group will have experienced more feelings of powerlessness and frustration via external forces. Also consistent with this are studies showing externals are less trustful and more suspicious of other people (Miller & Minton, 1969; Clouser & Hjelle, 1970).

Wagner (1975), found externality to be moderately correlated with two measures of trait anxiety in a sample of airman cadets. Other research has consistently indicated that externals describe themselves as anxious, less able to initiate constructive means of coping with frustration, and more concerned with fear of failure than with achievement (see Joe, 1971 for a review). In keeping with this is Lefcourt et als' (1975) finding that externals more frequently daydream about failure, and less frequently daydream about success or the future than do internals.

Shifts to a more internal orientation have been noted during the course of psychotherapy and life crisis resolutions (Smith, 1970; Gottesfield & Dozier, 1966; Gillis

& Jessor, 1970).

The findings from all of these studies raise the question of whether psychotherapy produces a belief in internal control, or whether perceiving the world as unpredictable and controlled by others produces psychopathology. Unfortunately, they do not answer this question. A further difficulty in making firm conclusions in this area is due to the fact that most studies rely on self report. As indicated earlier, externals are less likely to repress failures and unpleasant experiences. Thus, some of the differences could be more apparent than real. Little attention has been given to the possibility that extreme internals may also show poor adjustment because they believe that they are more in control than is warranted by reality.

Antecedents of I-E Orientations

There was considerable inconsistency and confusion in this section of the literature until researchers began to consider males and females separately (McDonald, 1971; Reimanis, 1971; Katkovsky et.al.,1967) and started to look at separate antecedents for the belief in powerful others as opposed to belief in luck or chance (Levenson, 1973).

In summary, it seems that a consistent, nurturant, and supportive early socialization fosters internality in males. However, for females, this sort of background, especially when associated with maternal protectiveness, is associated with an external orientation. Reimanis (1971) suggests that this is because such families raise their daughters according to the cultural expectations that girls should be more dependent ('external') whereas girls from more rejecting families, in order to meet a number of their needs, are forced to be more independent ('internal').

Both males and females who report that their parents used more punishing and controlling types of behaviour have been found to have greater expectations of control by powerful others. Individuals who perceive their parents as using unpredictable standards have been shown to have stronger chance orientations (Levenson, 1973).

Sex Differences

The early findings frequently indicated that although females tended to be more external than males, the differences were seldom significant (Rotter, 1966). Subsequent studies however, have frequently found significant differences (Feather, 1967, 1968). A study by McGinnies et.al. (1974) found that this tendency for females to be more external than males held across five different cultures, namely: Australia, New Zealand, America, Japan, and Sweden. Recent New Zealand samples of both students and adults have consistently shown higher externality scores among females (Wagner, 1976; Bradshaw & Housley, 1976). These differences would be expected from the previous discussions of the development of locus of control orientations.

Socioeconomic and Ethnic Differences

Studies consistently show lower socioeconomic categories and disadvantaged minority group members to be more external (see Rotter, 1966 and Joe, 1971 for reviews). These data are in keeping with the theoretical expectation that individuals who are constrained by economic and social barriers will develop an external orientation reflecting the lack of actual control in their environment.

Correlation with Measures of Depression

A number of studies show low but significant correlations between measures of locus of control and measures of depression (Miller, 1971; Ambromowitz, 1969; Palmer, 1971; Harrow & Ferrante, 1969; Prociuk et.al.,1976). Calhoun et.al. (1974) found much higher correlations. These studies all show that there is a tendency for externality to be related to the presence of relatively enduring symptoms of clinical depression.

Calhoun et.al. (op.cit.) also found that for their female subjects, there was a positive relation between the degree of depressed mood and the tendency to hold oneself responsible for it. The aothors related this to Douvan and Adelsons' (1966) observation that adolescent females hold themselves more responsible than males for unsatisfactory personal situations.

Consistent with the results summarized in the first paragraph of this subsection is Williams and Nickels' (1969) finding that externality was directly related to suicide proneness. Two further studies are in keeping with this and with the studies reviewed earlier. Abramowitz (1969) reported that externals indicated more feelings of anger and depression than did internals and Goss and Morosko (1970) found internals reported less anxiety, helplessness, depression, and clinical pathology on the MMPI.

Although these results appear to be conclusive, a cautionary note is in order. Lamont (1972a, 1972b) has suggested that because of pessimistic wording in some of the I-E items, measures of depression and locus of control may not be entirely independent.

Other Relationships with Depression-Related Constructs

Hopelessness is defined by Beck as a system of negative expectancies about oneself and one's future, and is considered by him to be a core characteristic of depression (Beck et al.,1974). Prociuk et al (1976) found hopelessness to be correlated moderately highly with both externality and depression. Depression and externality were less highly related. These writers proposed that hopelessness may mediate the relationship between locus of control and depression. A related finding by Durham (1972) indicated that depressed patients were less convinced than matched nondepressed controls of their ability to influence their mood by their own behaviour.

Rippere (1976) commented on the neglect by clinicians of the efforts people themselves take, both to prevent and cope with depressive episodes. She termed this coping behaviour antidepressive behaviour (ADB). Her studies indicated that in a number of disturbed and non-disturbed samples, internal males and external females had a much narrower ADB repertoire and found it less effective than external males and internal females. The relationship of this to actual depressive episodes is not yet known. Futher, Rippere herself reported that she saw no obvious reason for this interaction of antidepressive behaviour with sex and locus of control. However, her conclusion that:

> ....if such organismic variables systematically affect people's anti-depressive activity they will have to be taken seriously in any comprehensive formulation of the phenomenon (op.cit., p 298)

is the same point that is being argued here with respect to interference phenomena and depression.

Summary

A number of studies indicate that externals perceive reinforcements to be less contingent upon their own behaviour than is the case with internals. Locus of control orientations have been shown to be fairly stable and to exert an influence upon a wide range of behaviours in a variety of situations. Consistent with their increased expectancies of control, internals tend to have higher achievement motivation, show more attempts to influence their environment and realize goals, and to be more persistent at skill tasks. These same characteristics are reflected in their positive self images.

Externals differ from internals in the above respects. In keeping with their experiences of powerlessness and frustration via external forces, they show more anxiety, hostility, aggression, and mistrust of people. Their childhoods are characterized by unpredictability and punativeness and they are over-represented among the lower socioeconomic classes, ethnic minorities, and women.

Failure experiences tend to be retrospectively devalued by externals and attributed to environmental causes. In contrast, internals are more likely to attribute failure either to their own lack of effort or to their incompetence. Unlike the external's sensitization defences, they more commonly cope with anxiety arising from failure by repression.

This account is oversimplified as any account of complex phenomena unavoidably is. One important point is that although summarized as a typology, locus of control is conceptualized as a continuum with the majority of the population centrally distributed. A second aspect of the oversimplification is that there appears to be a subgroup of externals who display the external's defensive mode and yet act like internals in many other ways.

Finally, externality was found to be related to relatively enduring symptoms of depression and other depression-related phenomena.

LOCUS OF CONTROL AS TRAIT HELPLESSNESS

It was postulated in the previous chapter that locus of control may provide a trait conception to link with interference phenomena induced by immediate situational determinants. It was argued that such a trait, linked to the extended learned helplessness theory, could provide greater predictive power and validity as a model of learned helplessness in man. Further, to the extent that the latter is a viable model of some aspects of depression, it was proposed that it may help facilitate the type of framework that has proved so valuable in the field of anxiety and that is acknowledged to be lacking in the study of depression.

The question now to be answered from the review just outlined is, how viable does locus of control appear to be for this role? More specifically, is it a trait? Does it influence an individual's threshold to manifest interference phenomena in the face of uncontrollable aversive stimuli?

Locus of control is reasonably regarded as a trait in that it has persistence over time and exerts influence over a broad range of behaviours in a variety of situations.

The central feature of the locus of control concept is perceived control over one's environment - the same concern central to learned helplessness. Early socialization experiences of inconsistency and unpredictable trauma, and social barriers and lack of control or power in later life, appear to generate an external orientation. Individuals typified by this orientation have a lowered expectation of control in many specific situations, make fewer attempts to control their environment, and are less persistent in skill task situations. From these considerations, it would seem likely that such individuals would be prone to "give up" in situations of uncontrollability. Hiroto's (1974) experiment provides some evidence that this in fact the case.

If locus of control is a mechanism that modifies the helplessness threshold, and if learned helplessness is a viable model for a large number of reactive depressions, it would be expected that locus of control be related to measures of depression. This relationship has been shown. So too has a relationship with anxiety and frustration/ hostility - mood states that have also been demonstrated to accompany helplessness training and that are known to accompany reactive depression.

Epidemiological findings regarding depression consistently show it to be higher among females than males and for men, to be more prevalent in the working classes (Becker, 1974, p 64). This is the same pattern found with the external locus of control orientation. Suicide is frequently considered to represent the mortality rate of depression in that most sucides occur during acute depressive phases (Becker, 1974). Externality was shown to be correlated with suicide proneness and thereby, one could reasonably extrapolate, depressive episodes.

Externality has also been shown to be highly correlated with hopelessness, a construct that appears to be even nearer in the causal chain to depression than locus of control. Hopelessness involves not only the perception of lack of control over important aspects of one's environment but also the belief that the reason for this is one's own inadequacies. It is this combination that makes the situation hopeless. This is almost identical to the prescription the extended LH model indicates as the precipitant of interference phenomena. The hopelessness measure of Beck's may in fact be tapping relatively enduring helplessness states?

The above considerations are suggestive and provide some support for the idea of locus of control being an index of T-helplessness. However, when Hiroto (1974) considered the interaction of locus of control with helplessness, the LH model he was considering came directly from the early animal work. This was the position that held that the necessary and sufficient cause for interference was the belief that responding and outcomes are independent. Locus of control feeds into this framework in a very straight forward, uncomplicated way.

It was in this simplistic fashion that Hiroto treated it.

Subsequent human experimentation, however, has indicated the need for a more complex model. So too, incidentally, has the locus of control literature. Rotter (1975) has called for the necessity of a more sophisticated interactionist approach to efforts to relate his construct to behavioural outcomes.

The task now is to briefly consider how locus of control may be expected to impinge upon the LH model. This will allow a fuller consideration of its potential for helplessness trait status.

Hiroto (1974) proposed that as locus of control concerns expectancies of control, it would directly modify an individual's proneness to experience interference phenomena. However, subsequent human research and the extended LH model that embraces it, indicates the importance of other variables in the production of interference. As it stands at present, it appears that the cognition of responding and outcomes being independent is a necessary but not sufficient cause. The qualifications that need to be added are as follows: the outcome must be both important and aversive; the experience of uncontrollability must be of long duration; the cause of the failure to control the outcome must be attributed to relatively enduring aspects of oneself such as incompetence rather than lack of effort. If the outcome is important and the uncontrollability of short duration, reactance will occur. This is probably also the case if the cause is perceived as being due to lack of effort. If, on the other hand, the cause is seen as lying in the environment, depressed responding is likely in a particular situation. However, it is unlikely that this would be true interference that has cross-situational generality.

With these considerations in mind, it would be predicted that internality would lead to an enhanced reactive phase in the face of uncontrollability, not just because of an increased expectation of contingency between responding and outcome, but also because of higher achievement motivation which has the effect of increasing the importance of the task. Internals may also attribute initial failure to a lack of effort - again having an envigorating effect upon responding.

Social learning theory asserts that very general expectancies are only important behavioural determinants when a specific situation is ambiguous or novel. Thus, locus of control would be expected to be important at the early phase of exposure to uncontrollability, but as the subject's actual experiences of noncontingency continues, the situational reality per se is expected to become increasingly important. This being the case, it is predicted that internals will experience more interference than externals because of the former's tendency to attribute failure to themselves. As their increased efforts fail to produce any effect, they will be more likely to blame their own incompetence.

In contrast to internals, externals are predicted to be more prone to interference with low levels of helplessness training. Their generalized expectancies of uncontrollability would generate less initial reactance and a quicker swing into the interference phase. However, because they are less prone to attribute their failure to their own inadequacy and prone to retrospectively devalue the importance of the task, it could be that prolonged exposure to uncontrollability produces less generalized disruption of performance, relative to their earlier levels, than is the case with internals.

Thus, a consideration of locus of control in the context of social learning theory generates a more complex framework when related to the extended LH model than was originally considered. It produces an integrated state-trait model that leads to a large number of predictions that could be investigated empirically.

In spite of the conclusion of the last paragraph, it is also evident that locus of control is not the optimal H-trait. It is too broad. It includes expectancies of control over both positive and negative events, when it now appears that only noncontingent aversive events produce interference. Hence, a more specific trait such as Crandall et al (1965) developed with regard to children's scholastic performance (i.e., a separation of expectancies for positive and negative outcomes) may be more productive.

Additionally, it appears that both internality and externality have interference predisposing as well as interference resisting properties. This is of considerable theoretical interest. However, to fulfil the function of a H-trait, it would be desirable to have a more homogeneous construct.

Finally, current measures of I-E do not allow a separation of passive externals from defensive externals. This is a serious drawback because the latter group are in a number of ways similar to both internals and externals. From previous considerations, they are expected to be both persistent and yet resistent to interference after prolonged exposure to uncontrollability, because they defensively attribute failure to their environment. They may show depressed responding in a given situation. However, it would not necessarily be true interference that generalizes to other situations.

The points raised above are interesting in their own right and could be profitably investigated. The findings of such research would be expected to contribute to the development of a more adequate conceptualization of T-helplessness. In the meantime, there appears to be heuristic value in tentatively considering locus of control as a H-trait, albeit one that requires continued refinement as research progresses.

CHAPTER VI. AIMS OF THIS STUDY AND RESEARCH DESIGN

GENERAL AIMS

In chapter one, two general weaknesses of LH theory were noted. The first was the vagueness in the specification of boundary conditions (the generalization issue). The second was the lack of precision in specifying the conditions under which interference effects occur. These two weaknesses were shown to have ramifications throughout the learned helplessness literature. However, at the human level, their significance was greatly magnified.

In human experimentation, the generalization issue involves not only weakness in terms of lack of theoretical predictions on how far interference effects should generalize, it bears on the very question of whether interference phenomena have been demonstrated in man.

Interference effects were demonstrated in the animal experiments by showing inappropriate transfer of impaired responding from a situation where outcomes were noncontingent upon behaviour, to a different situation where they were contingent. In chapter three it was noted that there is considerable doubt as to whether such inappropriate transfer has been shown in the vast majority of human experiments where the post test is usually administered by the same experimenter, in the same experimental room, as a part of the same experiment.

Of the few experiments that did present the post test as a part of a distinctly separate situation, two showed the predicted effects, two did not. Thus, interpretation of the great majority of the human experiments is rendered ambiguous. Of the few where this is not the case, the results are not consistent.

One major aim of the experimentation conducted in this thesis was to determine whether the pretreatment most commonly used in the ambiguous experiments would produce effects of a similar magnitude in a post test when it was presented in both the usual way (i.e. as part of the same experiment), and as a part of a distinctly different situation (i.e. as a separate experiment). It was considered that the results of this investigation would help clarify the significance of the majority of the previous human experiments as well as providing some information on the much neglected question of generalization.

The second issue, involving the lack of fit between procedural definitions of LH and observed outcomes, has assumed major proportions in discussions throughout this thesis. Initially raised with respect to the animal literature, where the predictive capacity of LH theory was noted to be somewhat weak, it came up again in discussing the human literature. Here, it was shown that although the central mechanism postulated by LH theory was indeed a necessary cause for the production of interference, it was also shown to be even weaker in predictive terms.

To help improve the fit between theory and recent experimental findings, an extended model (largely taken from Wortman and Brehm, 1975) was outlined. It was argued that to refine theoretical predictions even further, and to provide a more valid and fertile model of both interference and depression, individual differences would have to be incorporated into this extended framework.

Although the importance of organismic variables had been suggested by Seligman in the early theoretical writings, they have to date been largely ignored. Inspired by Hiroto (1974), an attempt at integrating the personality construct locus of control was made. A tentative state-trait helplessness model, consistent with the theoretical and recent empirical findings of both learned helplessness and locus of control literatures, was outlined.

The second major aim of the experiments conducted in this thesis was to further investigate the interaction of locus of control with the environmental manipulations typically employed to generate interference effects. The major interest was the role of this trait variable in modifying interference proneness.

At the time the experimentation was planned and commenced, very little physiological information relating to helplessness had been forthcoming. LH theory in this respect was also particularly confused. A further aim was to obtain some data on this aspect of interference.

Information was also sought on the subjective concommitants of the environmental manipulations and their interactions with locus of control, to further understanding of how they related to changes at the physiological, motivational, and cognitive levels. Limited information was available on these points and they had not been considered previously in relation to locus of control and helplessness training interaction.

Besides these experimental aims, an attempt at clarifying some of the conceptual and theoretical confusion abounding in this rapidly growing area of research was given major priority. So too was the aim of producing an up to date, critical review of the very recent human literature, and its relation to the more established animal literature and theory. These aims were given the same weight as the experimental ones. This was because the rapidity with which this field has expanded, coupled with considerable confusion and contradiction, made this a requisite task before any meaningful research could be planned.

It needs to be noted at this time, that the experiments conducted here were underway before the findings that indicated the crucial role of attribution in the genesis of interference became available. Although given a prominent part in the theoretical models outlined in the two previous chapters, this aspect was not taken into consideration in the design of the experiments. This is unfortunate because it reduces somewhat the information that could otherwise have been obtained. Future experiments will need to take all of the variables outlined in the extended LH model into account if major gains are to be made.

HYPOTHESES

Pretest Task Performance

1. From the integrated state-trait (S-T) helplessness model outlined in chapter five, it was hypothesized that when subjects were exposed to 50 trials of 6 second aversive noise from which they could escape by learning and performing a simple button pressing task, the following would occur:

a) Internals, because of higher achievement motivation, increased concern to control their environment, a tendency to attribute initial failures to a lack of effort, and a heightened expectancy of their own efforts being effective, would learn the escape task more rapidly than externals.

b) Locus of control would be an important determinant of learning and performance over the early trials but, as all subjects gained more experience of the task situation and learned to master the task, the role of locus of control would diminish. This was expected to happen within the first 25 trials because the pretest task was a simple one to solve.

2. During exposure to inescapable noise, for the reasons listed under 1a on the previous page, it was hypothesized that internals would show more persistence in attempting to control the noise than would externals.

3. From the previous findings of sex differences in skill task performance (summarized in chapter four), it was expected that males would learn to escape more rapidly in the escapable condition and be more persistent in the inescapable condition. However, these predictions were not as firmly based as those relating to locus of control because of inconsistency in the literature. Consequently, the strength of the sex effect, or how it would interact with locus of control could not be predicted precisely. Additionally, Rotter's (1975) claim that defensive externals are more frequent among males, adds some weight to an expectation of facilitated performance in external males relative to external females. However, the presence of such individuals could not be determined a priori.

Post-Test Task Performance

1. Information regarding the effects of exposure to escapable aversive noise upon post-test performance is diffuse. A few studies found a mastery or invigoration effect - most found no significant differences in comparison with no pretreatment groups. Consequently, no a priori predictions were made.

2. Previous studies using similar amounts of inescapable

aversive noise pretreatment with heterogeneous student groups obtained 'interference effects' (when the post-test was presented as a part of the same experiment). Consequently, reactance effects were not predicted.

3. Based on the S-T helplessness model (with the attribution effects on interference excluded), it was hypothesized that external subjects who were exposed to inescapable noise, would show impaired performance on the anagram post-test relative to inescapable internals and to both no pretreatment and escapable pretreatment externals. Inescapable internals were not predicted to differ significantly from escapable and mo pretreatment internals.

A consideration of the experimental findings from outside of the LH literature suggested that males would be more resistent to interference effects. However, such predictions were not made because previous LH studies that considered sex differences failed to find interaction effects. From these results, it would appear that any sex differences were swamped by the strength of the environmental manipulations.

It is important to reiterate that at the time the experiments were designed, the role of attribution in generating interference was not known. This information became available while the experiments were in progress and resulted in the necessity of reconsidering the initial interference hypotheses.

With the attributional considerations taken into account, there arose the possibility that an interference effect would appear in the internal inescapable group. Although Hiroto (1974) did not find this effect using 30 pretreatment trials and a different post-test task to that used here, it was possible that 50 trials may be sufficient to override the initial activation and resistence phases of the internals. If so, because they are supposedly more prone to attribute failure to their own incompetence, the S-T helplessness model predicts <u>increased</u> interference among internals relative to externals. Thus, this additional information meant that firm a priori predictions could not be made in this respect because of a lack of information regarding the crucial amount of pretreatment variable. As it turned out, the results of this experiment, considered in the light of the more complex theoretical framework and in relation to Hiroto's (1974) results, provided important data bearing on this issue.

The addition of attributional considerations does not modify the predictions made regarding externals. However, the presence of defensive externals within this group, would lead to the additional prediction of increased variation in post-test outcomes among inescapable externals relative to internal inescapable subjects. Additionally, the tendency of both external groups (defensive and nondefensive) to attribute blame to their environment, reduces the amount of interference expected. However, these additional considerations do not change the direction of the initial prediction, only the finer details of its expression.

Subjective Effects of Pretreatment

1. From the S-T helplessness model and the emotionality hypothesis of LH theory (see chapter 1), it was predicted that:

a) External subjects who received inescapable noise pretreatment would rate themselves as feeling more stress following pretreatment than they did before.

b) Inescapable external subjects would experience more subjective stress than external subjects who received either no pretreatment or escapable noise.

c) No pretreatment and escapable noise externals would not show significant changes in stress following pretreatment.

2. From the same body of theory mentioned above, it was initially predicted that all three internal groups (no pretreatment, escapable pretreatment, and inescapable pretreatment) would experience no significant changes in reported stress following pretreatment. With the attributional addition and the resulting uncertainty regarding the effect of the inescapable pretreatment, it was hypthesized that if this group showed interference effects on the anagrams task, these would be accompanied by increased subjective stress.

3. Because of the finding of consistent low correlations between externality and anxiety, depression, and a variety of other indices of psychopathology, it was predicted that there would be initial differences between internals

and externals in terms of subjective stress. I.e., externals were predicted to rate themselves as more stressed than internals prior to receiving pretreatment.

Physiological Correlates of Pretreatment

1. From Maier and Seligmans' (1976b) LH model, it was predicted that:

a) Initially there would be no differences between escapable and inescapable subjects in terms of heart rate and peripheral pulse volume.

b) Over later trials, inescapable subjects would show less arousal, reflecting their decrease in task involvement and depressed mood.

Some uncertainty was attached to these hypotheses however, because Gatchel and Procter (1976) found a fractionation of physiological responding with uncontrollability, suggesting that the LH hypothesis is too simplistic. The nature of this fractionation cannot be predicted a priori - it has to be mapped out by investigations such as this one.

2. Because of externals' expectations of inability to readily master skill tasks, in this instance, learning to stop an aversive tone, it was predicted that they would show more arousal over early trials in both the escapable and inescapable conditions.

No a priori predictions were made regarding the differences between these groups over later trials or regarding their interactions with escapability and inescapability. This was because of the complexity of factors involved and the lack of prior information relating to this area. Additionally, habituation was expected throughout the recording sessions in all of the experimental conditions, further complicating more refined predictions.

Generalization

1. Learned helplessness theory (Maier & Seligman, 1976b) claims that interference effects have generality. Indeed, generalization is inherent in the very definition of interference effects because they are indicated by the transfer of impaired responding from one situation to a new situation. Thus, it was predicted that interference effects would be of a similar magnitude in a post-test embedded within the same experiment as the pretreatment, to those of a post-test presented as a separate experiment conducted by a different experimenter.

LH theory makes no statement regarding the differential generality of the three interference components. Neither does the extended S-T helplessness framework. Because cognitive-motivational and emotionality measures were made in both situations, some preliminary information could be obtained on this issue.

METHOD

Subjects

All Ss were from the Stage 1 Psychology classes at the University of Canterbury. Ss were administered the Internal-External Locus of Control Scale (Rotter, 1966), described in chapter five, at a lecture at least 10 weeks prior to the study. 15 Ss took part in practice experimental sessions in which the experimenter became familiarized with the complex apparatus, dependent variable measure recording, and experimental procedure.

73 Ss took part in the experiments proper. Non New Zealand-educated Asian Ss were excluded because it was found in the practice sessions that two such Ss had very poor anagram performance due to their difficulty with the English language. No Ss over the age of 32 years were included. The method of recruitment is outlined in detail in the procedure section.

Ss with I-E scores of 11 or less (Internals) and 16 or more (Externals) were randomly assigned to each of three treatment groups. Restrictions were that each cell was counterbalanced for sex. The mean for N.Z. students on this measure lies somewhere between 12-13 (see Locus of Control Appendix). A fourth group received the same pretreatment as one of the other three groups (i.e. inescapable noise) but encountered the post-test as a part of a separate experiment. This group included externals only. Each individual in this group was matched on the basis of I-E score with a subject with an identical score and of the same sex from the Inescapable Noise (Same Experiment) condition. Later, members of each pair received identical pretreatment by being yoked to the same Escapable Noise subject.

Of the 73 Ss, 3 were not included in the final sample. One was excluded because of a power cut during the pretreatment phase. Another declined to participate after receiving a trial burst of noise. A third S failed to learn to escape the noise in the escapable condition. This S was included in the pretreatment data but excluded from the remainder of the experiment. All three subjects were replaced by others of the same sex and with I-E scores from within the pre-selected range. The means and standard deviations of the experimental groups are given in Table 2.

TABLE 2. Mean I-E scores and standard deviations of the experimental groups.

Group		Internals		Externals	
		M	SD	M	SD
No Noise Control	Male	8.4	2.25	16.6	.75
	Female	8.2	2.14	17.4	1.85
	Total	8.3	2.20	17.0	1.30
Escapable Noise	Male	8.0	3.16	18.2	1.79
	Female	8.8	1.87	18.0	1.67
	Total	8.4	2.25	18.1	1.73
Inescapable Noise	Male	7.4	2.80	17.6	1.36
	Female	7.8	2.83	18.2	1.60
	Total	7.6	2.82	17.9	1.48
Inescapable Noise (Separate Expt.)	Male			17.6	1.36
	Female			18.2	1.60
	Total			17.9	1.48

Note. Each cell contains 10 Ss, 5 male, 5 female. The female S included in the pretreatment data but excluded from this table and the post-test data had a score of 16.

Apparatus

The pretreatment task consisted of 6 springloaded buttons,separated from oneanother by wooden partitions, and set in a 26cm x 26cm metal base. Red and green signal lights were located on the top of the base. See Figure 1 for a photograph of this apparatus.

A 3,000-Hz aversive tone was generated by an audiooscillator and delivered to the subjects via headphones where the tone was calibrated at 90 dBA. The red light on the base was activated simultaneously with the accoustic stimulus and remained on for the duration of the trial. The green light signalled a correct response (i.e. pressing of all 6 buttons, in any order, within 6 seconds of onset).

All of the circuitry and equipment, apart from the headphones and base, was located in another room, separated from the subject by a one-way mirror. Refer to Figure 2.

The length of noise bursts received by each Escape subject were recorded on audio tape from where they were transcribed onto record sheets (see Appendix 1) for later manual delivery of identical noise to a yoked inescapable subject. The intertrial intervals in both of these conditions, and the duration of noise bursts

FIGURE 1. Pretreatment Task Manipulandum

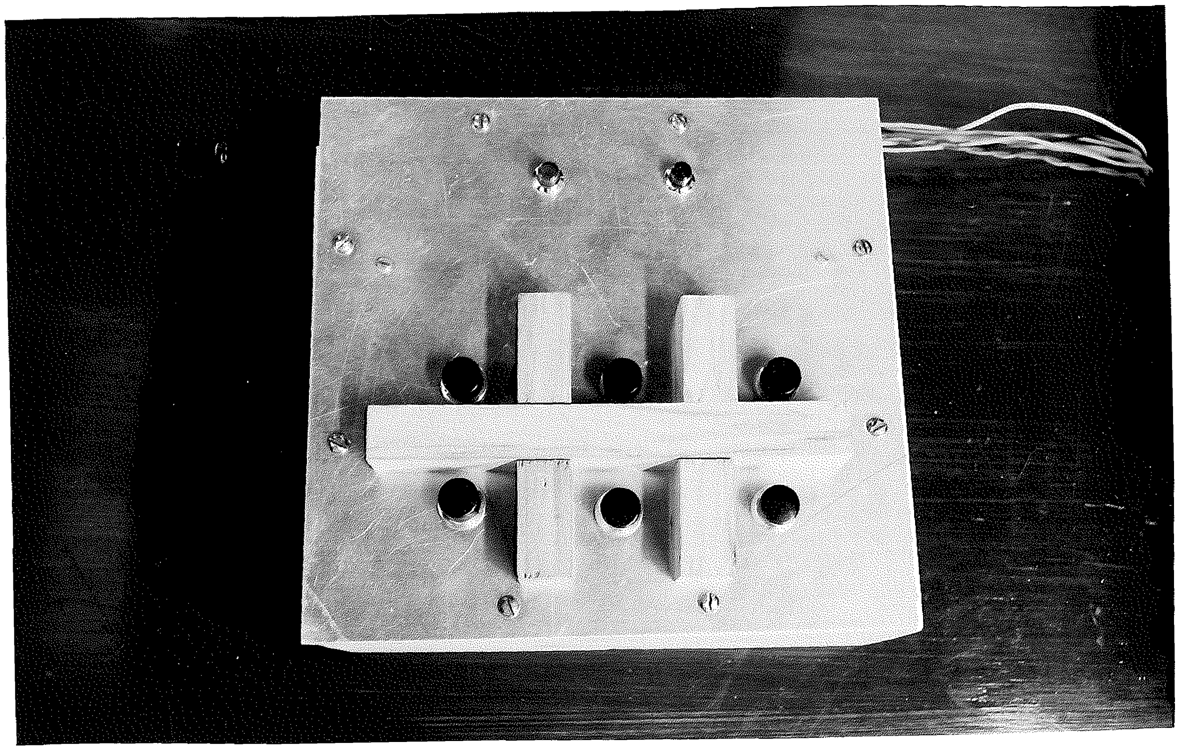


FIGURE 3. Anagrams Task

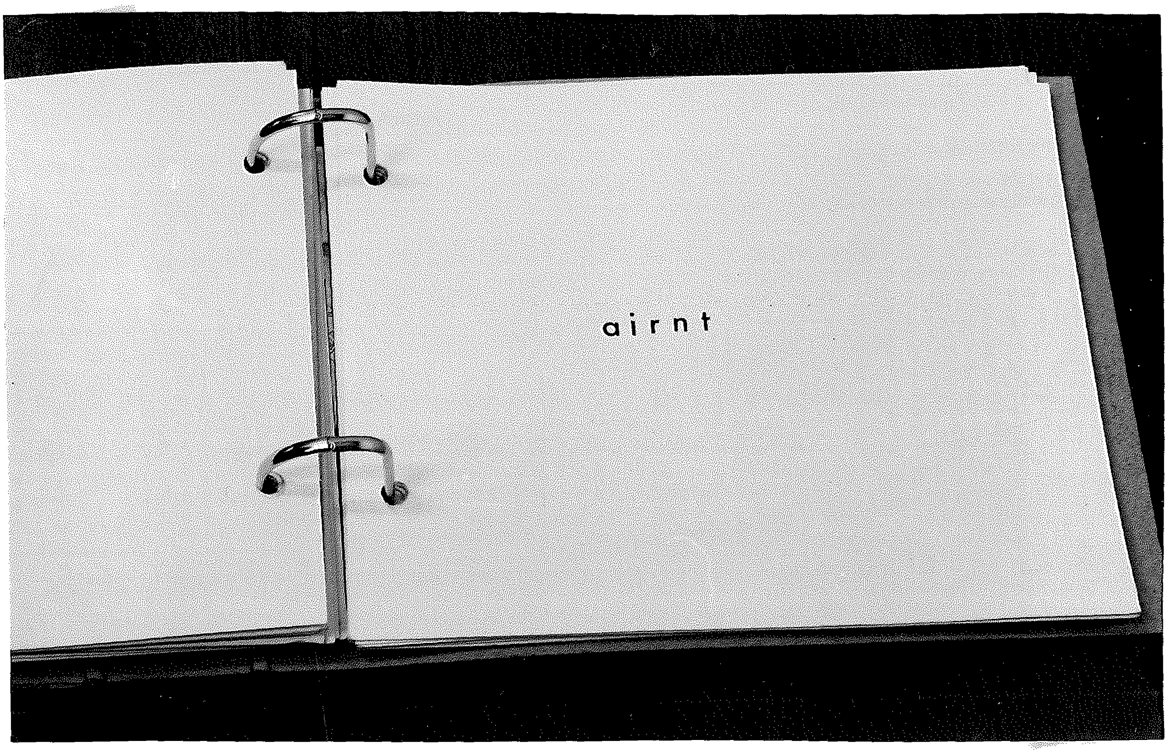
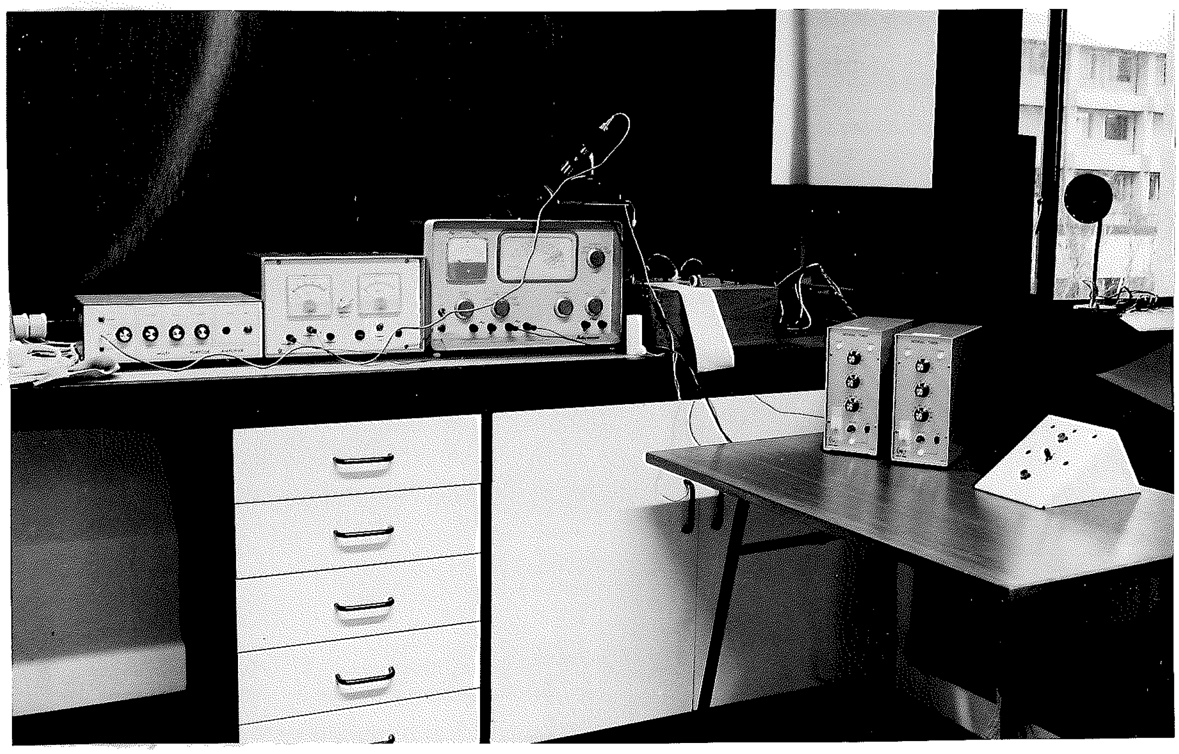


FIGURE 2. Apparatus: Experimenter's Room



Apparatus, from left to right

1. Amplifier
2. Voltmeter
3. Audiooscillator
4. Taperecorder and microphone
5. Datagraph (Lafayette Model 77011)
6. Automatic timers
7. Manual switch for noise delivery

in the Innescapable condition were timed by a stopwatch. In this way, the Escape and No escape treatments were equated in terms of intermittancy and duration of noise. A tape recorder was also used to present the instructions to the subjects.

The anagrams task used as the test task, was similar to that devised by Hiroto and Seligman (1975). This task consisted of 20, 5 letter anagrams that were individually placed on cards in a small ring binder (refer to figure 3 and appendix 2). Each of the anagrams was chosen from a list by Tresselt and Mayzner (1966) and consisted of five letters arranged in an identical 3-4-2-5-1 sequence (i.e. the third letter of the solution word was the first letter of the anagram; the fourth letter of the solution word was the second letter of the anagram; etc.).

Peripheral pulse volume (PPV) and heart rate (HR) were monitored with a Lafayette crystal pulse pickup (76605) which attached to the thumb by a velcro strap. Graphed recordings were produced by a datagraph system (Layfeyette Model 77011).

Procedure

Subject Recruitment

Names of individuals from within the I-E score ranges of 1-11 and 16-22 were randomly selected from the subjects who had previously been administered Rotter's scale. Small groups of these subjects were asked to wait behind after lectures where they were approached by the experimenter. They were informed that they had been selected from the class list and that although it was voluntary, the experimenter would be very grateful if they would participate in a noise pollution experiment he was conducting.

Of the initial 85 Ss sought in this way (includes the Ss in the practice sessions), 6 could not be traced after repeated attempts to contact them. These 6 names, along with 3 others who were dropped from the experiment for various reasons, were replaced by others. Of this total of 88 Ss, only one declined to participate. This s was also replaced. Although the above procedure involves a slight departure from purely random selection, it is probably more legitimate than alternative methods such as calling for volunteers, a procedure that involves a variety of selective processes.

The 10 Ss involved in the condition where the post-test was presented as a part of a separate experiment were approached somewhat differently. Again their names were read out in lectures, however, this time they were approached afterwards by two experimenters. The first experimenter (who had approached the other Ss) went through the same procedure he had previously. At the conclusion, he explained that the other experimenter was also conducting an experiment with Stage 1 Ss and that it would be convenient for him if they would also participate in his experiment.

The second experimenter (a paid confederate), explained that because he was drawing on the same subject pool for his Anagram Learning Experiment, not only would it be convenient, it would mean that his Ss had similar prior experimental experience and that this would reduce the possibility of bias to his results from this source. His timetable was arranged in such a way that Ss would be very likely to schedule themselves to arrive at his 'experiment' immediately after they left the first experimenter. It was convenient for the Ss to go to both experiments at the one time because, considered individually, they were of short duration. Had any Ss chosen different times, they would not have been discouraged. However, their results would have been discounted and new Ss selected to take their place. This did not prove necessary. These rather elaborate arrangements were made to induce the belief that the two experiments were quite separate and independent.

Pretreatment Phase

Ss were tested individually. After being greeted by the experimenter, the subject was taken to the experimental room and told that the experiment was concerned with the effects of noise on human physiology and behaviour. A sign above the laboratory door was consistent with this (see Figure 4). After having seated the subject at a table in front of a one-way mirror, each was asked to fill out a semantic differential type scale

FIGURE 4. Noise Pollution Sign

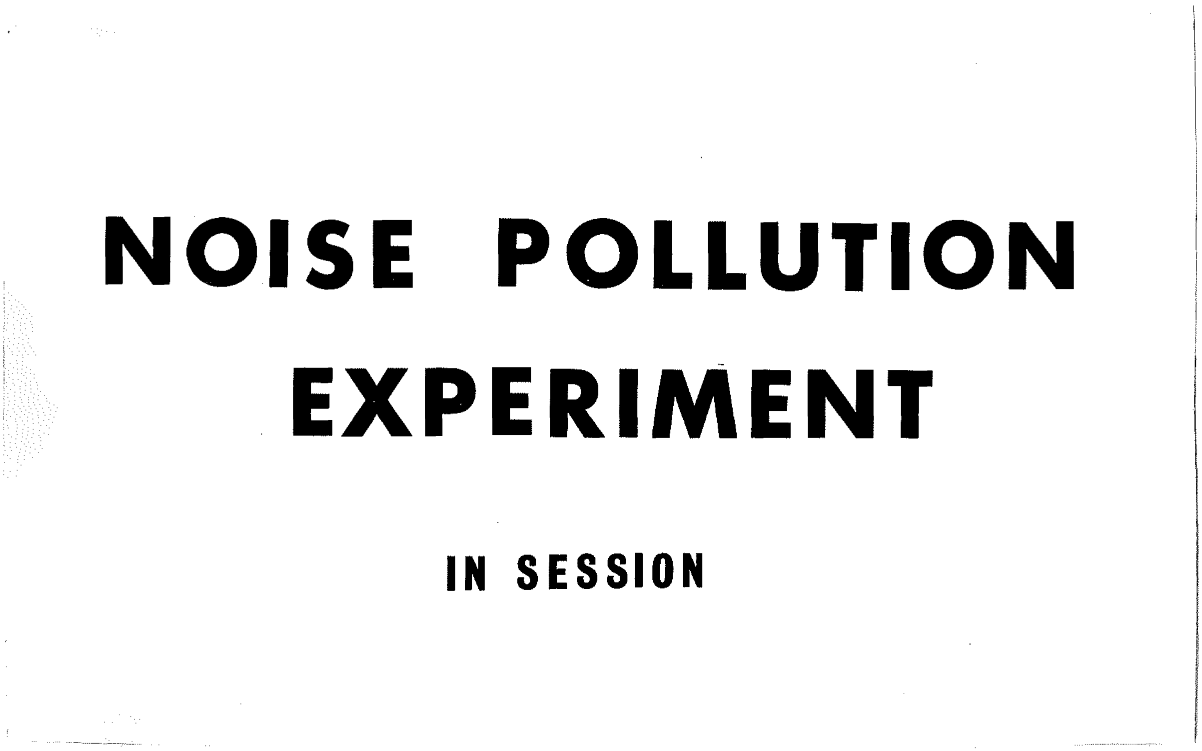


FIGURE 5. Subject at the start of Pretreatment.

which required them to rate themselves on a number of bipolar adjectives describing mood states (see Appendix 3). Ss were informed that the experimenter was going to the adjoining room to check the equipment and that he would return when they were finished. The one-way mirror was pointed out.

With Ss in the No noise condition, the experimenter returned, collected the rating scale, and thanked them for filling it in. He then informed them that there would be some delay because of problems with the equipment. They were asked to occupy themselves in any way they wished until the experiment was ready to proceed. A waiting period of 10 minutes followed with the experimenter returning once within this period to let them know that the fault would soon be fixed. At the end of the 10 minute interval, the experimenter returned, apologized for the delay, and asked the S to again fill out the rating scale. Ss were informed that it was the same form they filled out before but that the important thing was to fill it out as they felt at the very moment.

With Ss in the Escapable and Inescapable Noise conditions, the experimenter also returned and collected the rating scale. He then fitted the headphones to the S and gave an 8 second burst of noise. The S was informed that this was the intensity of noise that would be involved in the experiment and that they would have to experience a number of bursts of slightly shorter duration if they chose to remain in the experiment.

They were also told that although uncomfortable, previous studies had used more intense noise and not found it to be harmful. One S declined to participate at this point.

The S was informed that throughout the experimental session, physiological recordings would be taken. The transducer to detect heart rate (HR) and peripheral pulse volume (PPV) was fitted firmly to the palmer surface of the thumb of the right hand. The right arm was then rested on a bench at approximately the level of the S's heart. The S was instructed to rest the thumb in such a way that he or she felt could be maintained for more than 10 minutes. The importance of not moving the thumb was stressed. This procedure was found to produce less distortion than other methods that were tried during the practice runs. McGeorge of this Department also found this to be the case with the many subjects from which he took recordings in the course of his research into migraine headaches.

Once the S was comfortably seated and positioned, the manipulandum was positioned directly in front of him. See Figure 5 for a photograph of a S and the arrangement of the apparatus at this point in the experiment.

The experimenter left the experimental chamber at this time and returned to the equipment on the other side of the one-way mirror. The pen on the physiological recording equipment was activated and adjusted so that the pen deflections were initially approximately equal for all Ss. Following a 30 second delay, the following instructions were played to the subject:

> From time to time, a loud tone will come on for a while. When the tone comes on, there is something you can do to stop it. There are two lights located on the box in front of you. These lights will serve as signals for you. The red light comes on when the noise starts and switches off when it stops. If the green light comes on just before the noise stops, this means you have just made the correct response and have stopped the noise. If the green light does not come on, you have not stopped the noise. Rather, the noise has stopped automatically according to a preprogrammed schedule. Taking the earphones off and dismantling the apparatus in any way are not acceptable ways of stopping the noise.

All subjects received noise bursts at the same intervals (see Appendix 1 for the delivery schedule). Each burst was initiated by the experimenter. In the escape condition, subjects could terminate each noise burst by depressing each of the six buttons in any order. This automatically activated the green signal light that remained on for 2 seconds. The red light and the tone automatically shut off 1 second after the onset of the green light. This slight delay was to ensure that the noise bursts would be of reasonable duration for subsequent delivery to the inescapable subjects. The noise and the red light terminated automatically after 6 seconds if the S did not make the required response. From the schedule in Appendix

1, it will be seen that there were 50 trials with inter-trial intervals ranging from 8 to 20 seconds with a mean of 14 seconds.

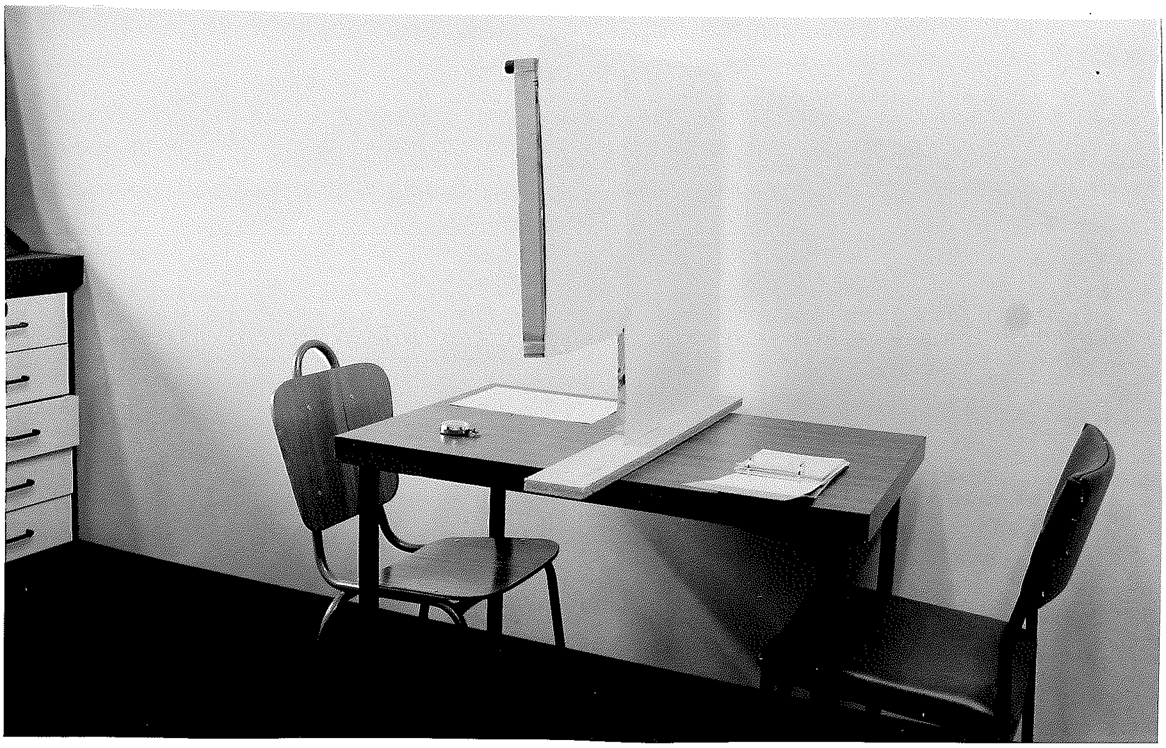
Subjects in the Inescapable condition were unable to stop the noise. The buttons were unconnected to the stimulus circuitry. In this condition, each S recieved noise bursts of identical duration to those already received by an escapable S. This was achieved by manually initiating and terminating the noise according to the completed record transcribed from the audio tape of the yoked Escapable subject's earlier performance. Figure 6 shows the experimenter working the manual noise control switch.

Besides these activities, the experimenter had to maintain a close watch on the physiological record, instantly returning the pen to the paper if the subject's movement caused it to deflect from the record sheet. Additionally, every fifth trial was scored with a one if the subject attempted to stop the noise. A response was scored as an attempt if the S pressed the buttons or handled the manipulandum in a purposeful way (e.g. picking it up and inspecting it closely), while the tone was on. The earlier practice runs were made partly in order to help reduce error on the experimenter's part in the face of the complex operations he had to perform.

As a check on the experimenter's performance,

FIGURE 6. Experimenter operating the manual noise delivery switch

FIGURE 7. Post Test Table and Apparatus



six of the No escape sessions during the experiment were taped. This allowed a reliability check to be made with the record of the yoked subjects. No more than a seconds error occurred on any occasion with respect to the duration of the noise bursts. This was also the case with the inter-trial intervals with the exception of one record where two of the intervals were between 2 and 3 seconds longer and one of the intervals was 2 seconds shorter. This is considered to be an acceptable degree of error in the context of this experiment.

Post Test Phase

After pretreatment, the experimenter waited for 90 seconds. He then reentered the laboratory. The headphones and transducer were removed and the subject was asked to shift to another table in the experimental room (see Figure 7). Here the subject was given the rating scale again and the same instructions that the No noise subjects received.

In the case of the Ss in the Inescapable noise - separate experiment condition, the experimenter waited only 20 seconds before returning. Instead of moving the S to the other table, he or she was thanked for participating and ushered out of the experimental chamber. The S then went on to the next "experiment". This was conducted in another room along the corridor by the second experimenter. The room was indicated by an appropriate sign (refer to Figure 8). Here, after a brief greeting, an identical procedure was followed to that about to be described for the Ss in the same experiment condition. The same table and apparatus was used.

When the ratings were completed, the experimenter took the sheet and placed the binder containing the anagrams on the table in front of the subject. The subject was asked to listen to the following tape recording:

> Listen carefully to these instructions as I am not allowed to repeat them. The task you are to do now is an anagrams task. As you probably know, anagrams are words with their letters mixed up and your task is to unscramble the letters so that they form a word. When you think you know the word, tell me what it is, and I'll tell you if you're right or wrong. The anagrams are contained in the booklet. Now, there may be a pattern or principle by which you can solve the anagrams, but that is up to you to figure out. Do not open the book and do not turn any pages until you are told to do so.

These instructions were modified slightly from those employed by Miller and Seligman (1975). The voice on this recording was that of the particular experimenter conducting this phase of the experiment.

The experimenter seated himself opposite the S. A screen separated him from the view of the S. This reduced nonverbal cues that may have otherwise

FIGURE 8. Anagrams Learning Experiment Sign

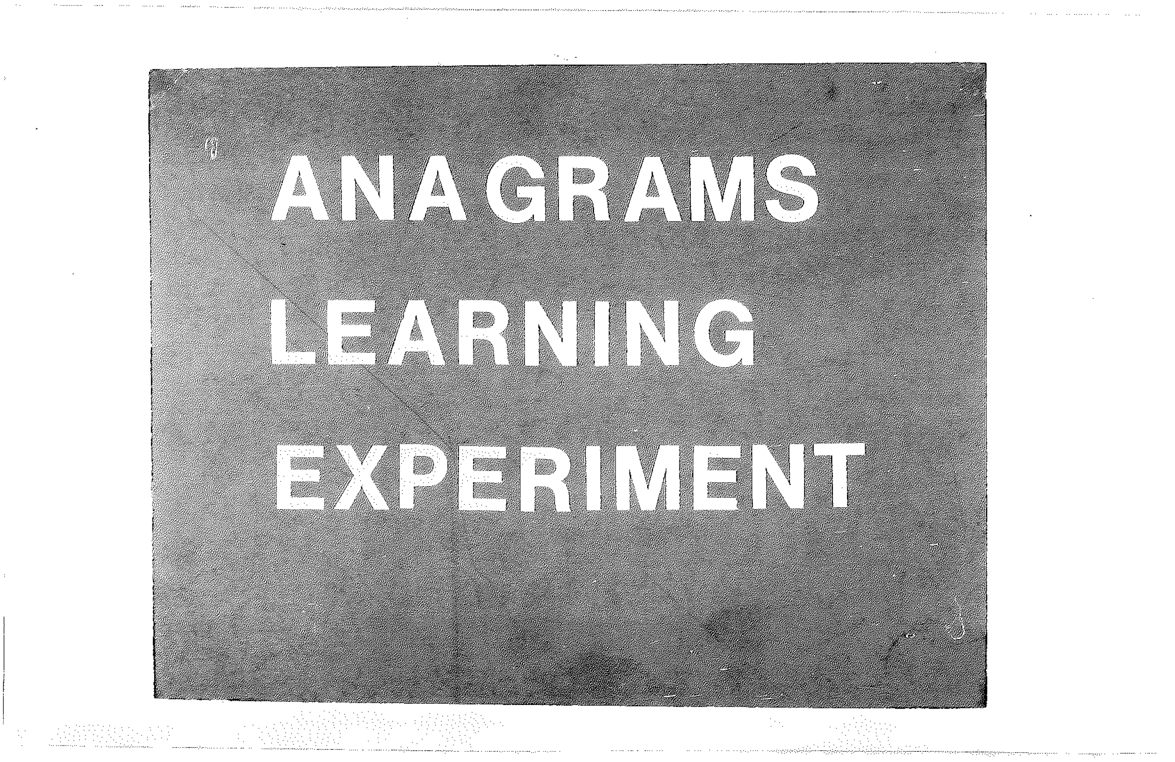


FIGURE 9. Post Treatment Anagrams Task

influenced the behaviour of either the S and/or the experimenter. A small gap in the screen allowed the experimenter to see when the page of the booklet was turned following his request. At this point he commenced timing the trial. Ss were given 100 seconds to solve each anagram. Although they could solve each one separately, the easiest way was to learn the standard letter sequence. Response latencies were timed with a stopwatch. This phase of the experiment is shown in Figure 9.

The same dependent measures used by Hiroto and Seligman (1975) were obtained from the anagrams task. These were: (a) the mean response latency for the 20 anagrams, (b) the number of trials to criterion for solving the anagram pattern, defined as three successive trials with a response latency less than 15 seconds, and (c) the number of failures to solve, defined as the number of trials with latencies of 100 seconds.

Following the anagrams task, Ss in the Escapable and Inescapable noise conditions were given a post questionnaire to complete (see Appendix 4). This questionnaire was designed to assess some of the subjects' attitudes towards the experimental situation and as an attempt to determine whether any unforseen demand characteristics (ref. Orne, 1962) were operating.

Finally, the subjects were thanked for participating and debriefed. Because some of the Inescapable Ss were mildly depressed in mood, more time was spent in debriefing them. Informing them that the noise was in fact inescapable appeared to be sufficient to alleviate any residual depression. The Ss were asked to undertake an agreement not to inform their classmates of the nature of the experimental tasks. Because such information would have been particularly disrupting to the Inescapable condition, Ss assigned to this condition were scheduled to arrive on the hour at the rate of 9 to 10 per day,on consecutive days. Each session took the full hour.

CHAPTER VII. RESULTS

PRETEST TASK PERFORMANCE

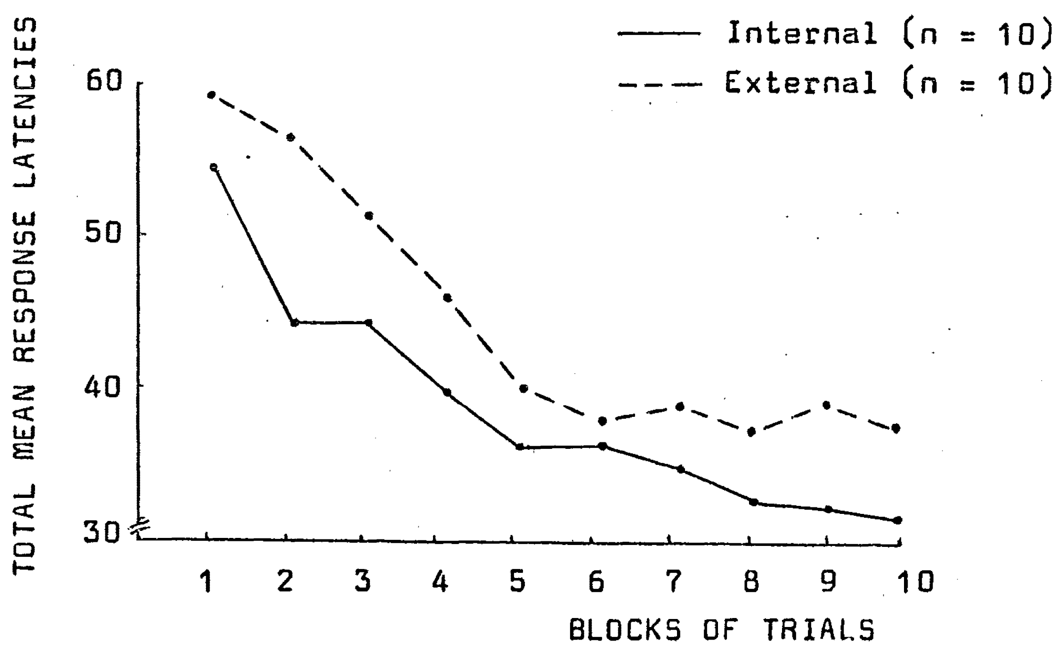
Escapable Condition

Response latencies and failures to escape for subjects in the escapable condition are given in Appendix 5. Sex x locus of control analyses of variance (ANOVAs) were conducted on two overall response measures, namely, the total number of failures to escape the noise and the total amount of noise received. The ANOVA summary tables are recorded in Appendix 6. Although the second analysis reflected a tendency for internals to perform better than externals and the first a tendency for this relationship to hold for males but not for females, neither evidenced acceptable significance levels (i.e. both were at the $p < .10$ level). These overall findings are of little consequence however as the major interest, from the point of view of the hypotheses outlined in the previous chapter, is in the differences between the four groups at different points during the pretest task. In this respect, the earlier trials are of particular interest.

Figure 10 shows graphically the total mean response latencies, grouped into five-trial blocks. Sex is not shown separately on this graph because none of the ANOVAs conducted on these data indicated sex effects or sex x locus of control interactions significant beyond the .05 level.

Although it appears from Figure 10 that there is a clear separation of the performance of internals and externals across all trial blocks, the planned sex x locus of control ANOVAs conducted on the first five five-trial blocks, indicated that this superiority of the internals only reached significance ($p<.01$) in the second block. A similar planned ANOVA, conducted on the final five-trial block to test for group differences at the end of the escapable pretreatment, also found a significant locus of control main effect ($p<.05$). These six ANOVAs are summarized in Appendix 6, Tables 3 to 8.

FIGURE 10 Total mean response latencies for Internals and Externals per five-trial block in the Escapable condition.



In keeping with current thinking on ANOVA interpretation with respect to the inability of the F ratio to provide information on the strength or magnitude of the association between independent and dependent variables as distinct from the statistical significance of the relationship (Keppel, 1973 and particularly appropriate to the theoretical questions addressed in this section, a measure of the magnitude of the locus of control effects was also determined. The $\widehat{\omega^2}\%$ index (Winer, 1971, pp 428-430) for the trial blocks on which the ANOVAs were executed showed that locus of control accounted for the following percentages of total variance: trial block 1, 3%; trial block 2, 37%, 3, 7%; 4, 5%; 5, 0%; 10, 19%.

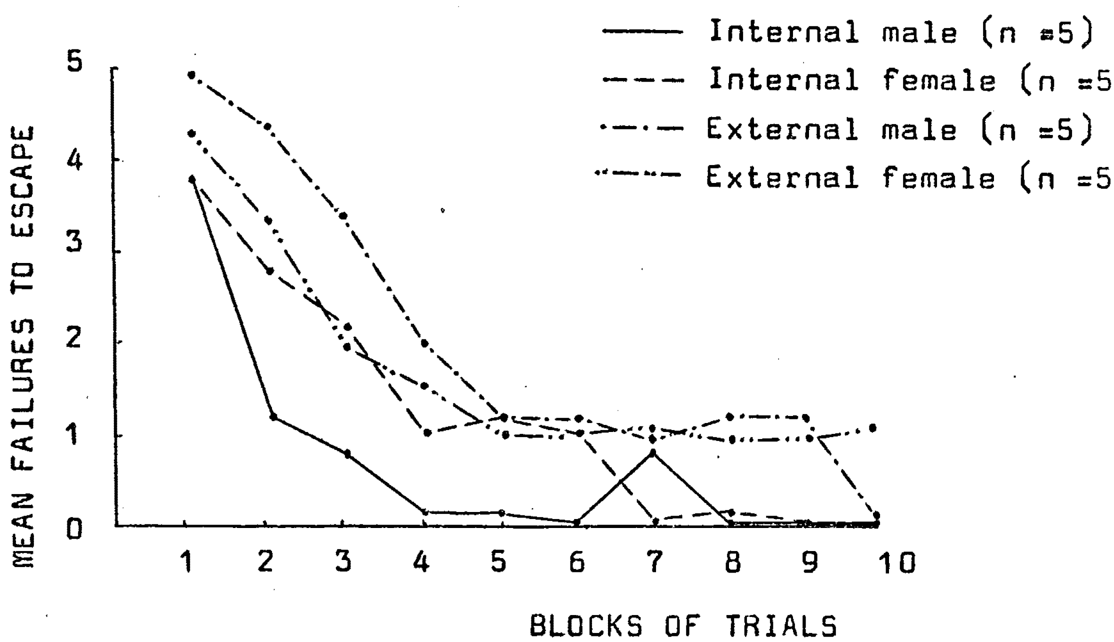
From the table in Appendix 5, it is apparent that the other dependent variable measure, failures to escape per five-trial block, is not suitable for analysis of variance because of very large violations of the assumptions of homoscedascity and normality. Although this is not so for the first two five-trial blocks, particularly if transformed logarithmically, in later trials this structure changes radically. Consequently, nonparametric statistical treatment is indicated for the greater portion of these data. For the sake of consistency, nonparametric methods were used throughout this section of the data.

Mean failures to escape for the four escapable treatment groups are displayed in Figure 11. From this display, it appears that there is a clear separation of the performance of the internal and external males, particularly over the earlier trials, but that no such difference occurs between the two female groups.

Kruskal-Wallis analysis of variance by ranks was employed with each of the first five five-trial blocks. The results were: block 1, χ^2 = 5.36; block 2, χ^2 = 10.12; 3,

χ^2 = 6.08; 4, χ^2 = 5.8; 5, χ^2 = 3.78. As with the analysis of the other dependent variable, a test was conducted on the final five-trial block with the result of χ^2 = 4.53. For all of these Kruskal-Wallis analyses, a χ^2 of 7.815 and above was necessary for significance at the .05 level. Thus, only the second trial block shows group differences significant beyond the .05 level.

FIGURE 11. Mean failures to escape noise for the four Escapable groups per five-trial block.



Mann-Whitney tests between all of the groups in the second five-trial block, taken two at a time, indicated that the internal male group performed significantly better than both the external males (U = .5, $p < .01$) and external females (U = 4, $p < .05$). None of the other comparisons reached significance, including the internal vs external females. Post hoc U-tests between the two male groups in trial blocks 3 and 4 also failed to reach significance. All of these tests are one-tailed, based on the predicted order of group means derived from the hypotheses outlined in chapter 6, pages 140 and 141.

In summary, the data from the Escapable subjects' pretest task performance indicates that locus of control is an important determinant of performance at the early phase of the task. On one dependent variable, internals showed superior performance to externals over the second block of five trials. Within this particular block, sex differences were also evident on the other dependent variable measure. Internal males, but not internal females, were significantly better than both external males and females. Sex differences were not evident between the external groups. The effect of these two trait variables became less important over later trials where they failed to reach significance. An exception to this occured on one dependent variable where an internal - external difference reappeared over the final trials. Except for one external female subject, all of the subjects learned to press the buttons to stop the noise.

Inescapable Condition

A sampling of attempts to control the aversive noise was used as the dependent variable in this phase of the experiment. The results are shown in Table 3. From the table, it appears that internals were more persistent at attempting to control the noise than were externals. A t-test indicated that this difference (i.e. between the internals

TABLE 3 Inescapable Subjects' Pretest Task Performance: Attempts to Control Aversive Tone.

Part A. Same Experiment Post Test Subjects

Experimental Condition	Subject	Trial Number 5	10	15	20	25	30	35	40	45	50	Total attempts to escape per s.
Internal Males	1	1	1	1	1	1	1	1	1	1	1	10
	2	1	1	1	1	1	1	1	1	1	1	10
	3	1	1	1	0	1	0	0	1	1	0	6
	4	1	1	1	1	1	1	1	1	1	1	10
	5	1	1	1	1	1	1	1	1	1	1	10
												46
Internal Females	1	1	1	1	1	0	1	1	1	1	1	9
	2	1	1	1	1	1	1	0	1	1	1	9
	3	1	1	0	0	0	0	1	1	0	0	4
	4	1	1	1	1	1	1	1	1	1	1	10
	5	1	1	1	1	1	1	1	1	1	0	9
												41
External Males	1	1	1	1	1	0	0	0	1	0	1	6
	2	1	1	1	0	0	0	0	0	0	0	3
	3	1	1	1	1	1	1	1	1	1	1	10
	4	1	1	1	1	1	1	1	1	0	0	8
	5	1	0	0	0	0	1	1	1	0	0	4
												31
External Females	1	1	1	1	1	1	1	1	1	1	1	10
	2	1	1	0	0	0	1	0	0	0	0	3
	3	1	1	1	1	0	1	1	1	0	0	7
	4	1	1	1	1	1	0	1	1	1	1	9
	5	0	1	0	0	0	1	1	0	0	0	3
												32

Part B. Separate Experiment Post Test Subjects

Experimental Condition	Subject	5	10	15	20	25	30	35	40	45	50	Total
External Males	1	1	1	1	1	0	0	0	1	1	0	6
	2	1	0	1	1	1	1	1	0	0	1	7
	3	1	1	1	1	1	1	1	1	0	0	8
	4	1	1	0	0	0	0	0	0	0	0	2
	5	1	1	1	1	1	1	1	1	1	1	10
												33
External Females	1	1	1	1	1	0	1	0	0	0	0	5
	2	1	1	1	1	1	1	1	1	1	1	10
	3	0	0	0	0	0	0	0	0	0	0	0
	4	1	1	1	1	0	1	1	1	0	1	8
	5	1	1	1	1	1	1	1	1	1	1	10
												33

Part C. Summary Statistics

Internals	mean = 8.7,	SD = 2.0
Externals (Same Expt.)	mean = 6.3,	SD = 2.76
Externals (Separate Expt.)	mean = 6.6,	SD = 3.26

KEY

1 = an attempt to escape

0 = no attempt to escape

and externals in Part A of Table 3) was significant ($t=2.12$, $p<.025$).

The performance of the inescapable external subjects who were subsequently given post treatment tasks as a part of a 'separate' experiment afforded a partial replication of the foregoing results. However, although the difference between the internals and the second external group (refer to Part B of Table 3) was in the same direction and of a similar magnitude to the previous contrast, it only reached the .10 level of significance, a level outside that accepted throughout this thesis. Both of these tests are one-tailed.

The lower significance level of the second test was largely due to the increased variation in the performance within the second group relative to the first - their variances being 10.6 and 7.6 respectively. Both of these are higher than that characterizing the internal group ($\sigma^2 = 6.3$). This increased heterogeneity within the external groups is not, however, significantly different from that of the internal's[1].

Although it appears from Table 3 that internal males were more persistent than internal females, neither this difference nor any of the other contrasts between the smaller component groups reached significance.

---

1. Tests on the differences between the standard deviations were conducted (Garret, 1955, pp 233-234). They yielded the following nonsignificant F-ratios: 1.85 (Internals vs Externals, Same Experiment), 2.6 (Internals vs Externals, Separate Experiment) with 9,9 df.

In addition to the above comments and tests on the overall response measures, it appears from the data presented in Table 3 that there is a tendency over time for all groups, although particularly the externals, to become less persistent in attempting to control the noise. To test this possibility, a repeated measure ANOVA for dichotomous data (Winer, 1971, pp 303-305) was conducted on the same experiment external group's results. The outcome of this analysis ($Q = 14.71$ with 9 df) was significant beyond the .10 level but failed to reach the acceptable .05 level. Because the trend of the data from this group appeared to be the strongest of the three groups in the direction described, further post hoc analyses were not conducted.

POST TEST TASK PERFORMANCE

The data from the anagrams task are outlined in detail in Appendix 7. Individual's performances on each anagram are given, along with three overall response measures for each subject, namely: mean response latency, failures to solve, and numbers of trials to criterion. Means for each of the experimental groups are given. Part B of Appendix 7 provides the same information regarding the two groups that received the post test anagrams task as a part of a 'separate' experiment.

2 (Internal vs External) x 3 (No Noise vs Escapable Noise vs Inescapable Noise) x 2 (Male vs Female) ANOVAs were conducted on each of the three dependent variable measures.

The summary tables are located in Appendix 8. All three ANOVAs indicated highly significant treatment effects and a significant sex x locus of control interaction. On one dependent variable measure, there was also a locus of control main effect.

Previous consideration of LH theory generated hypotheses that called for the following comparisons between experimental groups: No Noise (NN) vs Inescapable Noise (InEN) and Escapable Noise (EN) vs Inescapable Noise (to test for interference effects), and Escapable Noise vs No Noise (to test for mastery effects). Although the theory built up in earlier chapters further indicated the need to consider these comparisons separately for internals and externals and suggested the possibility of the need to also consider them separately for males and females, to allow a gross comparison with the majority of previous studies that used heterogeneous samples and did not consider organismic variables, these comparisons were performed on the overall results of each of the three dependent variables.

The results from the above analyses were as follows: (1) mean response latency, NN vs InEN ($t=2.82$, $p<.005$), EN vs InEN ($t=5.15$, $p<.0005$), EN vs NN ($t=2.33$, $p<.05$); (2) failures to solve, NN vs InEN ($t=3.38$, $p<.005$), EN vs InEN ($t=4.75$, $p<.0005$), EN vs NN ($t=1.37$, NS); (3) numbers of trials to criterion, NN vs InEN ($t=2.05$, $p<.025$), EN vs InEN ($t=4.86$, $p<.0005$), EN vs NN ($t=2.81$, $p<.01$). The NN vs InEN and EN vs InEN t-tests were one-tailed. Because firm prediction could not be made with respect to the EN vs NN contrast, the tests conducted on this contrast were two-tailed.

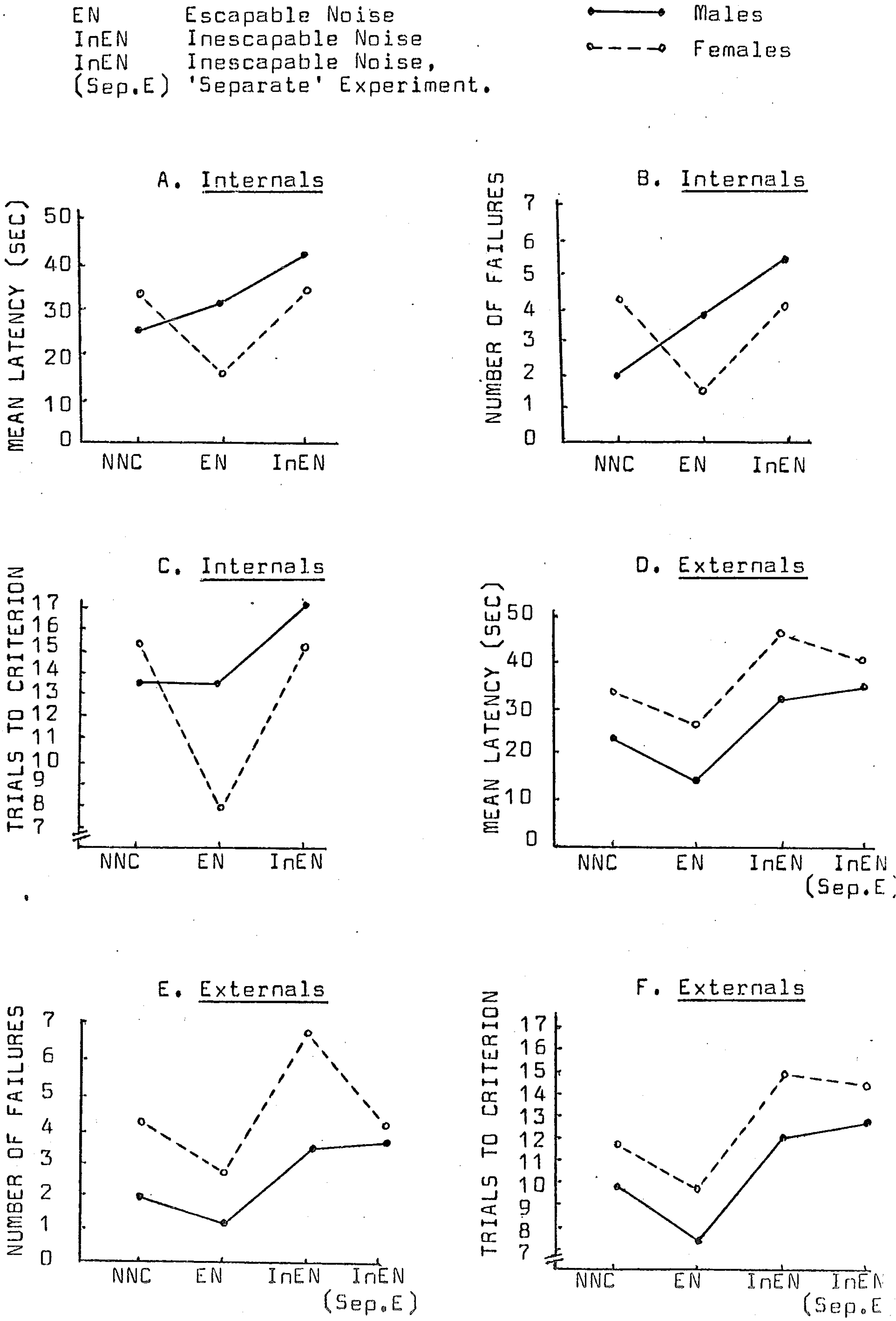
From these results, it is evident that the highly significant treatment main effects on the ANOVAs were comprised of both interference and mastery effects (in all bar one dependent variable where the EN-NN contrast failed to reach significance). The finding of mastery effects has an important implication for the interpretation of the results. It means that in this experiment, the EN vs InEN or the EN + NN vs InEN contrasts, both of which are commonly employed in the literature, will give an inflated 'interference' effect that is clearly not entirely due to inescapability. Although tempting to use these contrasts, as other researchers have, to do so would be both misleading and unjustified on the basis o present findings. The more conservative NN vs InEN noise contrast is best regarded as the appropriate indicator of interference effects.

The presence of interaction between the two trait variables in the analyses of variance supported the theoretical argument for the need of a more fine-grained analysis of the treatment effects than that already given. The mean anagram performances on the three dependent variables as a function of sex and locus of control are displayed graphically in Figure 12.

From Figure 12, it appears that the mastery effect is not present in the Internal Male group. Although present in the other three groups, it is of a lesser magnitude among externals. The interference effect, on the other hand, is

FIGURE 12. Mean anagram performance as a function of sex, locus of control, and type of treatment problems.

NNC No Noise Control
EN Escapable Noise
InEN Inescapable Noise
InEN (Sep.E) Inescapable Noise, 'Separate' Experiment.



seen to be present in all groups except the Internal Females. Also apparent in Figure 12, although more clearly seen in graphs C, F, and I of Figure 13, is the poorer performance of Inescapable Internal Males on all three measures, in relation to Inescapable External Males. In contrast to this, Inescapable External Females appear on these same graphs to have a poorer performance than their Internal counterparts on two of the three measures.

Graphs D, E, and F of Figure 12 contain additional information, relevant to the hypothesis of generalization of interference effects. With the exception of the External Females on the number of failures to solve measure, the External Inescapable groups show a similar performance on the anagrams post-test, irrespective of whether it was presented as a part of the same experiment or as a part of a 'seperate' experiment.

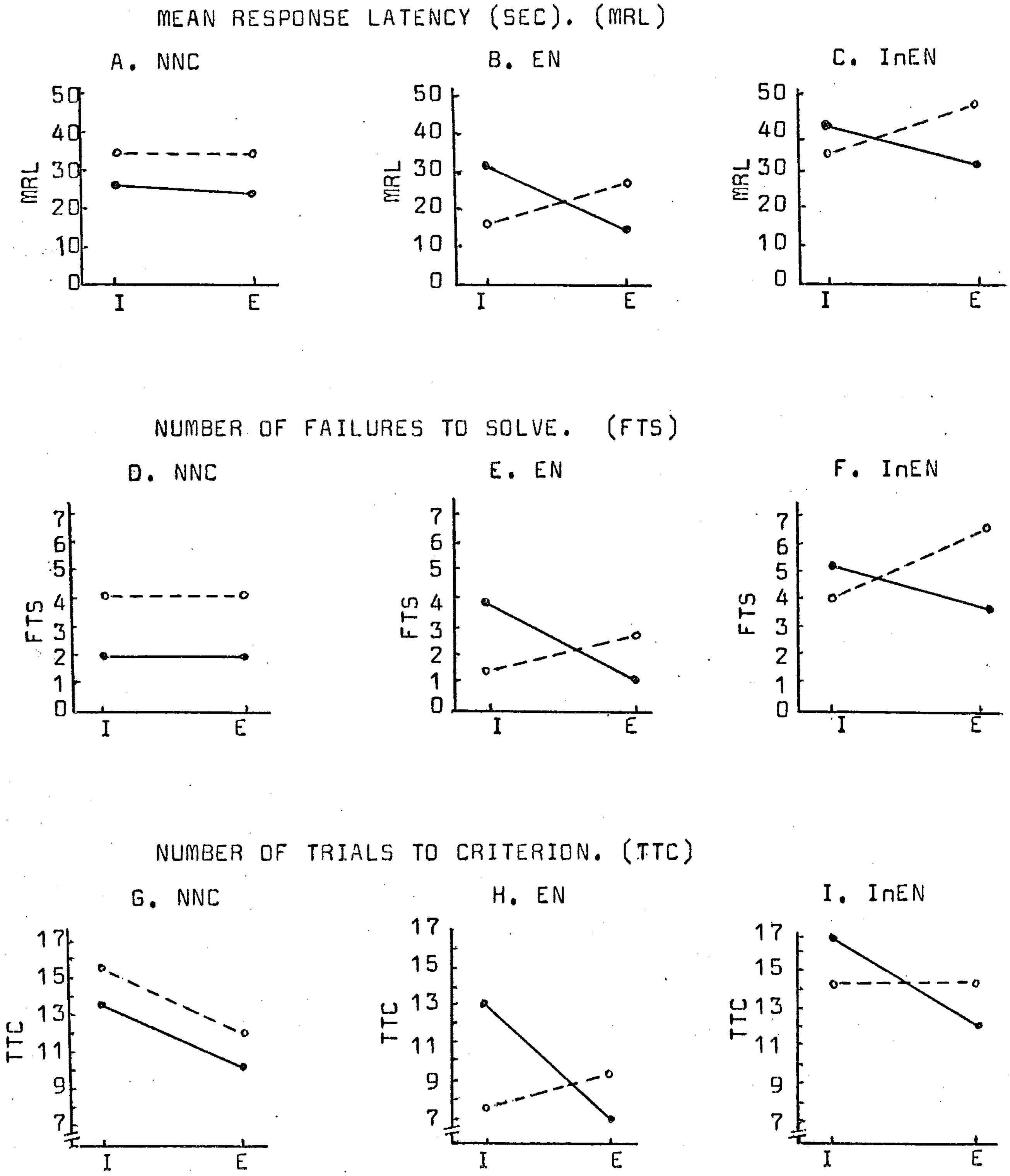
Not predicted from the earlier discussions of LH theory are three additional results evident in Figures 12 and 13. 1. Superior anagrams performance of No Noise Males relative to No Noise Females in all conditions. 2.Better performance of External groups relative to Internals within the No Noise condition on one dependent variable (refer to Graph G, Figure 13). 3. Better performance of External Males compared to the Internal Males within the Escapable condition. See graphs B, E, and H, Figure 13.

The statistical tests conducted on the planned

<u>FIGURE 13.</u> Relation between locus of control, sex, and type of treatment problem. Layout to show interaction effects.

NNC No Noise Control
EN Escapable Noise
InEN Inescapable Noise
I Internals
E Externals

Males
Females



comparisons derived from the experimental hypotheses generally support the pattern suggested from the graphed results and 'omnibus' ANOVAs.

Planned nonorthogonal contrasts between the Escapable Noise vs No Noise Control and Inescapable Noise vs No Noise Control groups in each of the four groups formed from the two trait variables, are outlined in Table 4. From this table, it can be seen that although the experimental data consistently shows a tendency for the Escapable groups to have a superior performance to the No Noise Controls (i.e.,a mastery effect), this effect is only definitely present in the Internal Female condition. Interference effects, on the other hand, as suggested in the earlier graphed presentations, are shown to be present in three conditions, the Internal Males, External Males and External Females.[1] Thus, the more complex pattern suggested by the graphed data and ANOVAs is largely confirmed. In addition to the earlier finding that the highly significant treatment effects are comprised of both interference and mastery effects, it is now evident that which occurs is also influenced by sex and locus of control, as well as by the nature of the dependent variable.

The additional planned contrast of EN vs InEN was not conducted on the four subgroups because of the involvement of

1. To allow comparison with Hiroto's (1974) findings, the performance of the two Inescapable Internal groups combined were compared with the corresponding groups in the No Noise condition. The tests on each of the three dependent variables gave the following results: mean response latency ($t=1.58$, NS), trials to criterion ($t=1.08$, NS), failures to solve ($t=1.79$, NS). Thus, when considered overall, ignoring sex differences, Internals fail to manifest interference.

TABLE 4. Anagram task performance: Significance levels* associated with the planned contrasts between the No Noise Control group and the Escapable and Inescapable (Same Experiment) groups in all treatment conditions.

Exptl. Condition	Dependent Variable	NNC vs EN t value	p	Mastery Effect	NNC vs InEN t value	p	Interference Effect
Internal Males	MRL	.84	NS	0	2.26	<.05	X
	FTS	1.64	<.10	*?	2.91	<.01	X
	TTC	0	NS	0	1.72	<.10	?
Internal Females	MRL	2.94	<.01	X	.07	NS	0
	FTS	2.36	<.025	X	.19	NS	0
	TTC	3.53	<.005	X	.18	NS	0
External Males	MRL	1.39	NS	0	1.43	<.05	X
	FTS	.73	NS	0	1.45	<.05	X
	TTC	1.24	NS	0	1.05	NS	0
External Females	MRL	1.17	NS	0	1.98	<.025	X
	FTS	1.45	<.10	?	2.18	<.025	X
	TTC	.86	NS	0	1.53	<.05	X

* t tests were conducted using the formula $\frac{(\bar{X}_1 - \bar{X}_2)}{\sqrt{MS\ error\ (\frac{1}{n_1}+\frac{1}{n_2})}}$.
Thus, the overall variance estimates were derived from the ANOVA MSs given in Appendix 8.

All tests were two-tailed with the exception of the External groups in the NNC-InEN contrast where prior theoretical considerations had afforded firm predictions of an interference effect.

NNC No Noise Control
EN Escapable Noise
InEN Inescapable Noise
MRL Mean Response Latency
FTS Failures to Solve
TTC Trials to Criterion
X Effect present
0 Effect not present
? Marginal significance
*? Marginal significance in the opposite direction to that predicted.

mastery effects. The way in which this contamination reduces the value of this contrast has been previously discussed.

Theoretical predictions called for two types of planned comparisons between the Internal and External Inescapable groups. Both are outlined in Appendix 9.

The first type compared mean anagram performances. Although Internal Males showed poorer performances on all three dependent variable measures, the differences from the External Males failed to reach traditionally accepted levels of significance. External Females were more impaired than Internal Females as predicted, however, again the differences failed to reach significance.

The second type of comparison evaluated the prediction of increased variation in the response of externals to inescapability relative to internals. As predicted, in no case was the variance of the Internal Inescapable groups greater than that of the corresponding External groups. However, again the differences failed to reach significance at the .05 level.

To test the generalization hypothesis for this section of the data, t-tests were performed on the External Inescapable (Same Experiment) vs the External (Seperate Experiment) groups. The tests were conducted separately for males and females and the prediction was that the null hypothesis would be retained. Because the subjects in each of these experimental conditions were matched on the basis of their I-E scores, sex, and the pretreatment received (see the method section), the t-test for related samples was used.

From Table 5, it can be seen that the expectation of no significant differences between the two conditions was supported. In only one case did a difference approach significance. However, acceptance of the hypothesis that the means are equal (the null hypothesis) does not constitute proof that the hypothesis is true. Strictly speaking, it is simply an indication that it is one of several hypotheses that are compatible with the available data. Kurtz (1966, pp 175-176) states that more specific statements can be made in this situation by determining the confidence limits for the differences. This has been done and the results are indicated in Table 5.

TABLE 5. Anagram Task Performance: Test of the differences between the Inescapable Noise (Same Experiment) and the Inescapable Noise (Separate Experiment) groups to evaluate the generalization of interference effects.

Experimental Condition	Dependent Variable	Comparison* Obtained Difference	t value	p	Confidence Limits
External Males	MRL	1.37	.19	NS	-18.81 to 21.55
	FTS	.60	.42	NS	-3.38 to 4.58
	TTC	.80	1.37	NS	-.82 to 2.42
External Females	MRL	8.03	1.32	NS	-8.85 to 24.91
	FTS	2.40	1.67	$<.10$	-1.57 to 6.37
	TTC	.60	.18	NS	-8.67 to 9.87

* To avoid negative numbers, the scores from the group with the smaller mean are subtracted from the larger mean.

MRL=Mean Response Latency
FTS=Failures to Solve
TTC=Trials to Criterion

From the calculations of confidence limits, it is possible to assert that there is a 95 percent probability that the true difference lies somewhere within these limits. Because the variances of the groups listed in Table 5 differed quite considerably in some of the comparisons, in spite of the matching procedure, the confidence limits could not be drawn very tightly. However, in one case, the comparison between the male groups on the trials to criterion measure, the values within the limits are close enough to zero to strongly suggest that only hypotheses that assert either no differences or very slight differences between the two groups are tenable. The certainty of this postulate of little or no difference between the effects of the two types of testing conditions would be strengthened if subsequent studies used a Bayesian approach and incorporated the confidence limits from this study as prior probabilities. In this way, the confidence band could be further tightened (or loosened) with the accumulation of further evidence.

Apart from the above quantitative results, subjects in experimental conditions that induced impaired anagrams performance (Inescapable Noise Internal Males and Inescapable Noise External Males and Females), often appeared depressed in the post-test situation, speaking slowly and displaying little affect in either their speech or facial expression. Little weight can be given to these observations however, as the experimenter was not blind to the experimental conditions. Comments made by the subjects during the anagram task were listed on the record sheet. Seven subjects in the interference - inducing conditions (28%) made remarks that suggested they were evidencing some form of cognitive disturbance. Comments included the following examples: "I just can't seem to think straight", "I'm having trouble thinking". Only five of the forty-five subjects in the other conditions (11%) were noted as making similar remarks.

SUBJECTIVE EFFECTS OF PRETREATMENT

An overall stress index was derived from the series of rating scales administered to the subjects before and after pretreatment. A composite score was obtained by adding the scores on each of the 14 subscales (see Appendix 3). Because the rating instrument was designed to offset response set bias by alternating 'positive' (low stress) with 'negative' (high stress) directions to the separate scales, in deriving the overall score it was necessary to first subtract the score of every second scale from 8. Thus, a high score on each scale indicated a stress state (e.g. depressed, bored, angry). The analysis of this section of data is restricted to this overall stress index.[1]

Individual stress scores are given in Appendix 10. A summary of this data is provided in Table 6.

TABLE 6. Mean subjective stress scores and standard deviations before and after pretreatment.

Experimental Condition	Before Pretreatment		After Pretreatment	
NNC I Males	38.4	(13.98)	41.2	(11.39)
NNC I Females	49.4	(8.10)	49.6	(6.09)
NNC E Males	39.0	(3.16)	38.4	(4.03)
NNC E Females	39.2	(7.03)	37.8	(6.55)
EN I Males	43.0	(8.90)	43.8	(8.45)
EN I Females	46.8	(7.03)	48.8	(4.79)
EN E Males	47.6	(7.0)	40.4	(3.36)
EN E Females	43.6	(6.53)	50.8	(4.98)
InEN I Males	36.4	(7.91)	50.0	(17.60)
InEN I Females	53.2	(3.76)	53.0	(5.40)
InEN E Males	47.0	(8.04)	57.0	(6.99)
InEN E Females	44.6	(7.32)	58.6	(7.99)
InEN E Males, Sep.E.	41.8	(5.76)	47.8	(7.47)
InEN E Females, Sep.E.	51.6	(9.98)	56.8	(9.17)

KEY NNC No Noise Control; EN Escapable Noise; InEN Inescapable Noise; Sep.E. 'Separate' Experiment

I Internals; E Externals

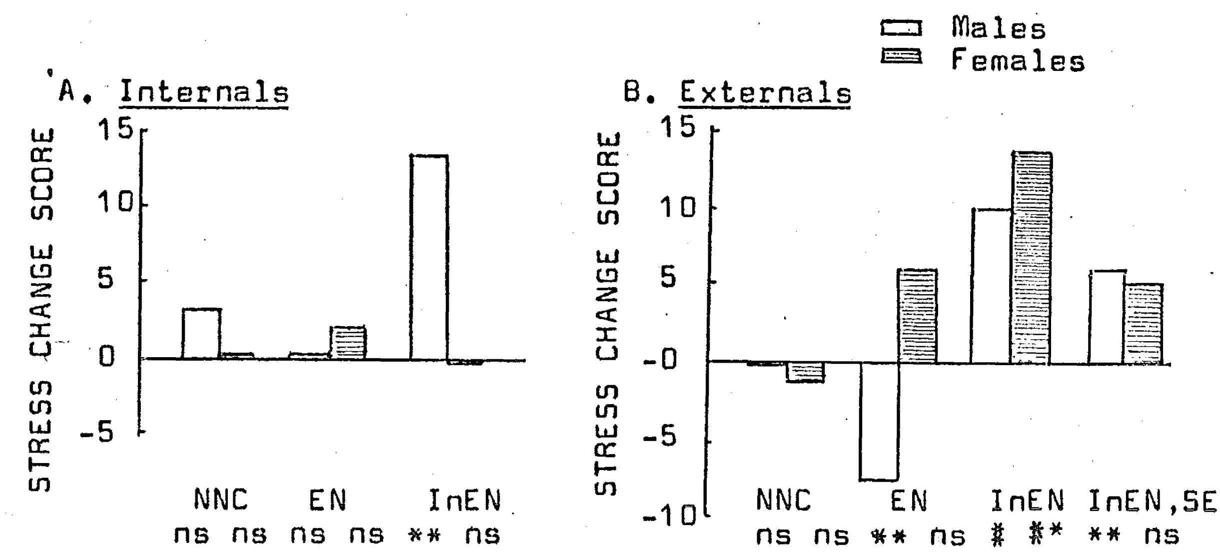
Note: Standard Deviations are in parentheses.

1. A more detailed analysis of the data in this section is planned to be conducted at a later date. Each of the 14 items will be analyzed in terms of the 14 experimental conditions with scores on the first presentation used as a covariate to increase sensitivity.

A number of apriori comparisons derived from theoretical considerations were planned for this section of data. However, considerations relating to the findings of the previous section led to some changes in the analyses actually conducted. In particular, the escapable vs inescapable noise contrast was also dropped in this section. Additionally, to allow the results from this section to be considered in relation to the previous section, the data from males and females were treated separately.

The first group of comparisons was addressed to the hypotheses concerning change in subjective stress following the different pretreatments (see 1a, 1c, and 2, p 144). The data upon which these analyses were executed is given in Table 6. Figure 14 shows the changes in stress ratings following pretreatment more clearly and includes the significance levels associated with each change.

<u>FIGURE 14</u> Subjective stress change scores and associated significance levels* as a function of sex, locus of control, and pretreatment.



KEY NNC, EN, InEN see Table 6. **p<.05 ‡p<.005
SE Same Experiment ‡*P<.025

NOTE T-tests for related samples used with 4df. *Tests 2-tailed except for InEN externals & InEN internal males (1-tailed).

From Figure 14 it can be seen that significant increases in subjective stress followed exposure to inescapable noise in three of the four groups that received post-testing in the context of the same experiment, namely: External Males, External Females, and Internal Males. Internal Females, the fourth group, showed no evidence of change. The two inescapable external groups that received post-testing in the context of a separate experiment also showed increased post treatment stress - although less than their counterparts in the previous condition. Only one of these two groups reached acceptable significance levels, although the other group (the females) approached marginal significance ($t=1.7$, $p<.10$). Only one of the other experimental groups evidenced significant change. I.e., the Escapable External Males rated themselves as experiencing less stress after pretreatment than they did before. Comment on the relation of these results to the findings of the previous sections and the experimental hypotheses is reserved until the next chapter.

Planned contrasts were also conducted between the post treatment ratings of the Inescapable Noise (Same Experiment) groups and the No Noise groups. Both the No Noise External Males vs Inescapable Noise External Males and the NN External Females vs InEN External Females yielded highly significant results in the predicted direction (i.e., increased stress in the Inescapable groups). T-tests for independent samples yielded ts of 4.03 ($p<.005$) and 4.12 ($p<.005$) respectively.[1] Corresponding tests between the Internal groups failed to reach significance even though

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1. Both tests 1-tailed with 8 df.

there was a moderate difference in the predicted direction in the case of the male group (see Table 6). It is evident from the table that the t-value of this latter contrast was held down by very large variations among individuals within these two cells.

Initial differences between internals and externals were predicted. In the case of males, the hypothesized relationship was found to hold, with external males indicating more initial stress than internal males ($t=2.19$, $p<.02$). For females, the situation was reversed. Consequently, the planned unidimensional t-test had to be abandoned. A two-tailed post hoc t-test was conducted in its place and yielded a t of 2.19 ($p<.05$), suggesting that the internal females experienced significantly more initial stress than external females.

InEN External subjects from the same and separate experiment conditions were compared. In both the male and female groups, as was predicted and obtained with this comparison in the previous section, the null hypothesis was not rejected (ts= 1.63 and .09 respectively).

PHYSIOLOGICAL CORRELATES OF PRETREATMENT

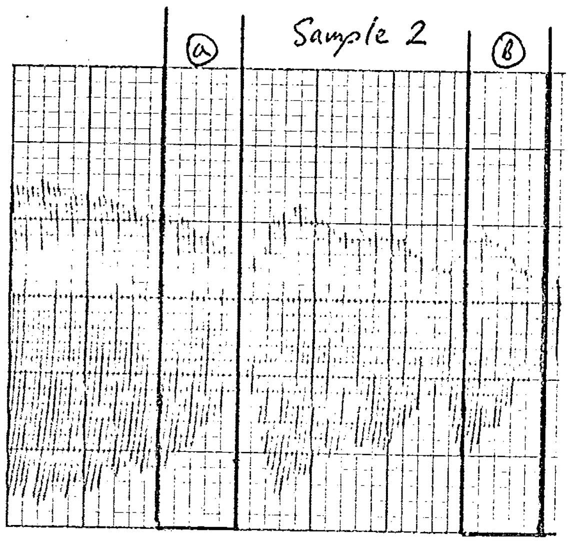
Data Reduction

Peripheral pulse volume (PPV) and heart rate (HR)[1] were recorded from the EN and InEN subjects throughout the

1. Strictly speaking, the measure obtained is pulse rate. In the literature however, HR is more commonly used to refer to the index derived in this way.

pretreatment phase of the experiment. The continuous records produced by the datagraph system were reduced for analysis by a sampling procedure. Two small segments, 3 cm apart (see Figure 15), were taken at five separate locations. The first location sampled was that immediately after the subject received the taped instructions. The final sample was from the point immediately after that where the last noise burst had been received. The other three locations were at equal intervals between these two.

FIGURE 15. A section of a physiological record to demonstrate the sampling method employed in data reduction.



Because the graph paper moved at a constant speed, HR was simply obtained by counting the number of vertical lines within the two segments sampled (a & b on Figure 15), dividing by two, and multiplying the result by a constant to convert to beats per minute. PPV, in contrast to HR, is a relative measure rather than an absolute one. The initial sensitivity (the area covered by the record pen) was set by the experimenter for each subject. The PPV index was obtained by counting the number of squares touched by the pen in the two segments of each sample point and dividing this number by two. A low score on this measure indicates an increase in stress arousal (Barabasz, 1977). This reflects a reduction in the amount of blood flowing through the thumb.

Results

HR and PPV scores of individual subjects in each of the experimental conditions from which data were obtained are given in Appendix 11.

From Appendix 11, the loss of data from some of the subjects is apparent. Data loss is potentially a very serious matter when it comes to the interpretation of experimental findings. For this reason, a brief consideration of this loss is necessary at this point.

The most common cause for the lost recordings in this experiment was excessive movement artifact that obscured the graphs of some individuals to such an extent that sample measures could not be made. The other cause was the inability to get the physiological responses of some subjects onto the scale employed by the datagraph system. Both of these sources of loss could conceivably be related to the independent variable manipulation. If so, the assumption of random selection would be violated and any interpretation based on the findings would be suspect.

Fortunately, the data loss does not in fact appear to be systematic in that the subjects from whom records were not obtained did not appear to be atypical in terms of their performances on the anagrams and subjective stress measures. Nevertheless, some doubt must remain and consequently, the analyses conducted in this section must be considered with more than the usual degree of caution.

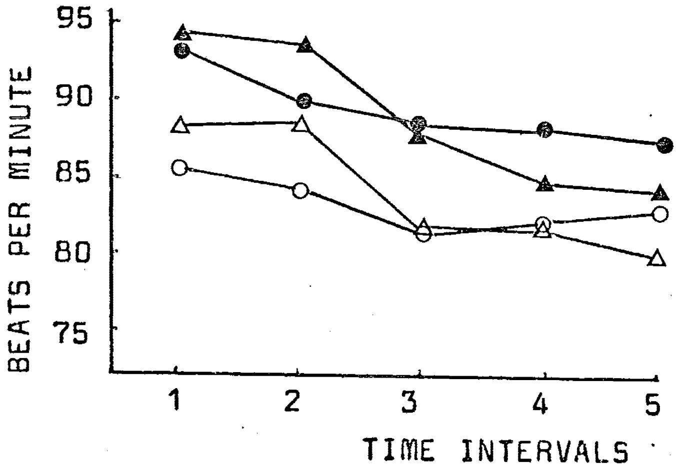
The other implication of the data loss was that some cells contained too few subjects for meaningful analysis. Consequently,the fine-grained analyses of the previous sections could not be repeated in this section. Sex was not considered separately and the InEN same experiment and 'separate' experiment subjects were lumped together. Although crude, the analysis of this section of data was considered to be warranted because of the paucity of information on this aspect of interference and because it is the only information to date on this aspect of interference in relation to locus of control.

. The mean scores at each sample interval for the two physiological measures as a function of locus of control and escapability-inescapability are displayed graphically in Figure 16.

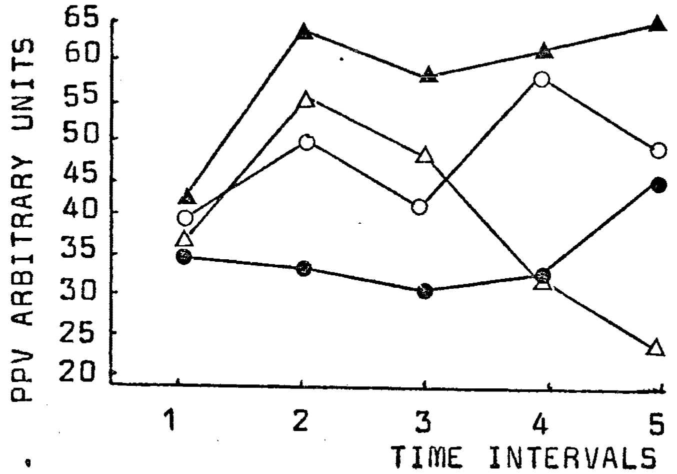
From Graph A of Figure 16, it appears that there is a decrease in HR in all groups over time and that this tendency is more marked in the two inescapable groups than in the escapable groups. Both external groups also seem to

FIGURE 16. Heart rate and peripheral pulse volume for the treatment groups at five intervals during pretreatment.

A. Heart Rate



B. Peripheral Pulse Volume



KEY

●——● Escapable Noise Externals (n=9)

▲——▲ Inescapable Noise Externals (n=17)

○——○ Escapable Noise Internals (n=7)

△——△ Inescapable Noise Internals (n=9)

Note Each point on the graphs is a group mean.

A low score on Graph A indicates low arousal. On Graph B, a low score indicates high arousal.

be more aroused on this measure than are the internal groups, particularly over the early part of pretreatment. The escapable and inescapable groups do not differ appreciably from each other although there is a slight tendency for the two inescapable groups to have a lower heart rate at the end of pretreatment.

The statistical tests performed on the HR measures were congruent with the pattern just described. The mean decreases in HR from the first to the last interval for each of the experimental groups and the significance levels associated with these changes were as follows: InEN Internals, 8.35 beats per minute (bpm), $t=3.02$, $p < .01$; InEN Externals, 7.78 bpm, $t= 3.17$, $p<.005$; EN Internals, 1.14 bpm, $t= .72$, NS; EN Externals, 5.76 bpm, $t= 2.74$, $p < .05$. These tests were all one-tailed as they were planned tests, based on the hypothesis of habituation in all conditions.

Planned comparisons between the combined internal and external groups at intervals 1, 2, and 5, yielded the following results: 1, $t= 3.37$, $p<.01$; 2, $t= 3.61$, $p<.001$; 5, $t=3.37$, $p<.01$. Post hoc tests conducted on intervals 3 and 4 also yielded significant ts (3.12, $p<.01$ and 2.65, $p<.02$ respectively). All five tests were two-tailed with 40 df. Thus the higher HR of the external groups evident in Figure 16 are significantly different from the internal groups throughout the entire pretreatment period even though the mean difference decreased from 7 bpm to 4.43 bpm.

None of the planned InEN External vs EN External and

InEN Internal vs EN Internal contrasts, at intervals 1, 2, and 5, reached significance.

The mean PPV scores of the four groups that are considered separately in this section are shown graphically in Figure 16, Graph B. The most obvious feature of this presentation is the divergence of the two inescapable groups over the two final time intervals. Whereas the Inescapable External group maintains its relatively less aroused state, the Internal subjects in the Inescapable condition become increasingly aroused. In contrast to this latter group, the other three groups evidence a decrease in arousal from the first to the last time interval. A final point that presents itself is the lower arousal of the Inescapable Externals relative to the Escapable Externals.

The pattern just described is complicated by the wide individual differences that occur within each of the cells (see Appendix 11). The score distributions are often bimodal. These characteristics of the data are not apparent in the graphical representation; indeed, they are obscured by it. Apart from being of interest in its own right, this finding suggests that non parametric methods would be more suitable than parametric approaches in the analysis of these data.

Wilcoxin matched pairs signed-ranks tests were conducted on first vs last interval scores for each of the four groups to test the significance of changes over time. Only the Inescapable Noise Internal group yielded a significant result (T=4, p<.05). Thus, the tendency for decreased arousal over time in three of the groups does not reach significance whereas the tendency for the InEN Internal group to become more aroused does.

Planned comparisons between the EN Internals vs InEN Internals and the EN Externals vs InEN Externals at the second and fifth sample intervals were conducted with Mann-Whitney U-Tests. Only one of these comparisons reached significance, the EN vs InEN Externals at interval 2 (U= 24.5, p<.01).

In summary, the physiological data were characterized by wide individual variations in response to the experimental manipulations, particularly the PPV results. Nevertheless, some general patterns were discernable. There was a tendency for all groups to display habituation to the noise over time, although this change was not always significant, particularly in the escapable groups. On the PPV measure, the InEN Internals deviated markedly from this pattern, evidencing a significant increase in arousal over the latter part of the pretreatment. With the exception of the last group, differences between the escapable and inescapable groups were in the predicted direction, with inescapable ss showing less arousal over the later trials. However, these differences failed to reach significance, largely because of the wide individual variations within each of the groups. Locus of control effects were not apparent on one dependent variable but, on the other (HR), externals showed significantly more arousal than internals, particularly over the earlier trials.

POST EXPERIMENTAL QUESTIONNAIRE RESULTS.

Post experimental questionnaires (see Appendix 4) were administered to all ss who had received inescapable noise, to obtain information on the way they perceived certain aspects of the experimental situation and to attempt to gauge whether demand characteristics or related sources of bias were operating, in spite of the efforts made to rule out such influences.

The results of the five questions forming the structured part of the questionnaire are provided in Appendix 12. 2 (Internal vs External) x 2 (Escapable vs Inescapable Pretreatment) x 2 (Male vs Female) ANOVAs were conducted on these results. The ANOVA summary tables are given in Appendix 13, Tables 1 to 5.

Table 1 shows a highly significant treatment effect ($p<.001$) which, interpreted in the light of the results displayed in Appendix 12, indicates that the inescapable groups felt, relative to the escapable groups, that no matter what they did, they could not control the pretreatment task. Thus, the inescapable noise condition was effective in creating a helpless situation that was perceived as such by <u>all</u> the inescapable groups.

The second ANOVA (Table 2) shows that no significant differences occurred between the groups in perceived aversiveness of the tone. Table 3 reveals a significant locus of control effect. Observation of the raw data in

Appendix 12 that is relevant to this analysis suggests that the source of the effect lies in the greater anger felt toward the experimenter by the inescapable external Ss compared with that of the inescapable internals. A post hoc t-test on this contrast shows it to be significant ($t=2.5$, $p<.05$). This result, although not predicted, is of theoretical interest and will be discussed in the following chapter.

No significant effects were found in the last two ANOVAs, indicating no differences between the groups in terms of anger felt toward the experimenter during the Anagrams task (in contrast to the situation obtaining with respect to pretreatment) and no differences in terms of how difficult the Ss felt the Anagrams task to be. The results of the inescapable noise external (separate experiment) Ss were generally similar to those of the inescapable noise external (same experiment) Ss included in the ANOVAs. Consequently, no additional analyses were conducted on these data.

Responses to the first open-ended questiom showed that most Ss appeared to accept the explanation of the experiment presented to them (i.e. a noise pollution experiment). A small percentage said that they thought the experiment was an attempt to study the effects of either task failure and/or stress. These Ss did not seem to link this to the Anagrams task however. Rather, they saw the major interest as lying in the physiological or subjective correlates. None mentioned depression or learned helplessness.

The second open ended question yielded a variety of responses. Of major interest was the finding that none of the Ss in the inescapable conditions said that they felt the experimenter expected them to do poorly or worse than they did; on the contrary, a large number of these Ss said that he expected them to do better than they did. A number of Ss said that the experimenter had no expectations one way or the other - one s added to this, "like a good experimenter"!

CHAPTER VIII. DISCUSSION OF THE RESULTS.

PRETEST TASK PERFORMANCE

The hypotheses addressed in this section were generally supported by the experimental results. Locus of control was shown to be an important determinant of performance on the button-pressing task in both the escapable and inescapable conditions.

In the previous chapter, significant differences between internals and externals were noted in the escapable condition during the second trial block. On the dependent variable analyzed by parametric methods, locus of control was also shown to account for 37 percent of the total variance at this point, this high percentage quickly dropping away on subsequent trial blocks. On the other dependent variable, the difference only held for internal males.

The emergence of these differences at this stage is best interpreted as a difference in the rate at which internals and externals learnt to master the button-pressing escape task. Thus, as hypothesized (see 1a, p 140 and 3, p 141), the internals learnt fastest, particularly the internal males. As the externals learnt to master the task, shortly behind the internals, the differences between the two groups diminished to a point where they failed to reach significance.

These results are consistent with the characteristics that previous research has shown to differentiate internals from externals. I.e., as indicated in Chapter Five, internals typically have higher achievement motivation, increased concern to control their environment, a tendency to attribute initial failure to lack of effort, and a heightened expectancy of their efforts being effective. These are all characteristics that lead to the expectation of increased motivation, task involvement, and faster learning. The results are also in keeping with those of earlier studies that have evaluated the role of locus of control in skill-task performance situations (see p 115).

The tendency for internal males to learn faster than internal females, a finding evident with both of the dependent variables but only significant with one, is also consistent with work on sex differences in skill-task performance (see Chapter 4 and p 141). Sex differences were not apparent among the external groups however, as could be expected if the claim that defensive externals are more common among males than females (Rotter, 1975) has any validity. However, when sex differences are considered within subcells, the groups being considered are down to five subjects in size. In such a small sample, an effect has to be strong to reach significance.

The dropping off of the importance of locus of control as a determinant of task performance is in keeping with hypothesis 1b (p 140), derived from Social Learning Theory. This theoretical system asserts that general expectancies, like locus of control, are only important behavioural determinants at the initial stages of a particular situation. As experience with the situation continues and becomes less ambiguous, situational factors override more generalized organismic variables (see pp 110,111). In the light of these considerations, the reemergence of a locus of control effect (albeit one of both less importance and lower significance) over the last trials on one of the dependent variables was unexpected. This reemergence, after all the Ss (with the exception of one external s) had mastered the task, is probably best regarded as a reflection of motivational differences between the two groups. However, whether this is really so, and why the reemergence at this particular point, are unknowns.

The significantly greater number of attempts by internals to control the aversive noise in the inescapable condition of this experiment was also found by Hiroto (1974). This was also predicted from the characteristics typifying internals.

This finding in the inescapable condition appears to parallel the concept of'immunization', coined in connection with the early dog studies where dogs given prior experience of escapable shock evidenced enhanced panel pressing when exposed to inescapable shock. The factors that lead to the development of an internal orientation (see Chapter Five) appear to be broadly analogous to this animal learning experience.

The effect that characterized the internals was most obvious in the male subgroup. Although the male-female difference did not reach significance, the trend noted is consistent with work showing that males tend to display a number of qualities similar to internals in certain laboratory situations (see p 94) that may aggregate with internality influences to produce higher expectancies of success and persistence on skill tasks in internal males. As with the escapable findings, the results of the inescapable groups showed no support for this speculation with respect to external males.

The locus of control findings in this section, in addition to being important in understanding how this variable influences post-treatment effects, also provides support for the construct and predictive validity of the I-E Scale.

POST TREATMENT EFFECTS

Cognitive-Motivational Effects

The Anagrams task performance has been described previously (Chapter 3) as an index of both cognitive and motivational factors. Although it does not provide a complete separation of these two constructs, the trials to criterion measure has been regarded as tapping a more cognitive aspect than the other two dependent measures employed in this study, both of which are seen as being more responsive to motivational effects. Although the precise nature of the Anagram dependent variable measures are uncertain, the results of the present experiment clearly show that this task is sensitive to effects produced by inescapable and escapable noise pretreatments.

Ignoring sex and locus of control effects for the moment, the overall results on the Anagrams task can be considered as a further demonstration of 'cross modal' (Hiroto & Seligman, 1975) interference from an instrumental to a cognitive task.[1] In addition to this finding (i.e., highly significant interference effects on all three anagrams dependent variable measures), significant mastery effects were also found on two of the three measures.

The finding of mastery effects deserves some comment because they have been found in other studies (e.g. Benson & Kenelly, 1976) and yet have received scant attention with regard to either their nature or the implications of their presence for the analysis and interpretation of results from studies employing the triadic design. Although this second aspect has been touched upon in the last chapter, both of these aspects are considered to be important and will be discussed after the remainder of the post test effects have been considered in greater

1. This assertion rests on the assumption that the post-treatment situation can be considered to be sufficiently different to involve an "inappropriate generalization" when performance is impaired. This has been amplified elsewhere in the text.

detail.

A major aim of the current investigation was to further understanding of the influence of organismic variables upon the environmental manipulation that has been shown to produce interference in heterogeneous samples. This is part of an attempt to isolate additional factors that, considered in relation to the extended LH model, will aid the development of a theoretical framework that will provide a better fit between dependent variable outcome and antecedent manipulations.

When the two trait variables manipulated in this experiment (sex and locus of control) were considered in relation to the environmental manipulations, rather complex relationships emerged. This supported the view argued throughout this thesis for the need to consider both trait and state (situational) factors to gain a fuller account of behavioural outcomes.

Although males consistently performed better than the females on the anagrams when they received no prior pretreatment, neither thisnor locus of control differences reached significance (except on one measure where externals were superior). This finding is in contrast to that characterizing the escapable and inescapable conditions. In these conditions, sex and locus of control were both important determinants of anagram performance.

As initially predicted (hypothesis 3, p 142), inescapable externals evidenced interference effects and inescapable internals did not. This was what Hiroto (1974) found using a similar inescapable aversive noise pretreatment (although he used 30 trials instead of the 50 employed here) and a different post-treatment measure. In contrast with the result of the current experiment was his further finding that externals had poorer performance in all experimental conditions.

The internal-external difference in the inescapable Ss is consistent with the suggestion that internality functions like immunization does in the animal experiments. The increased motivation and generalized expectancy of control in internals, developed from a history of mastery experiences, leads to increased striving when such individuals confront a seemingly uncontrollable situation. In contrast, externals, with their lower generalized expectancies of control, more quickly 'give up' when faced with uncontrollability. This interpretation is also consistent with the findings of the pretest task performance phase of the experiment conducted here. Internals made significantly more attempts to control the inescapable noise than did externals and their efforts persisted throughout pretreatment.

However, where Hiroto obtained a pure locus of control effect, in the present study, this trait variable interacted with sex. The more fine-grained analysis that this interaction indicated was necessary showed that the apparent 'immunity' of the internals was actually accounted for by the internal females. The inescapable internal males, in contrast to the former group, evidenced a highly significant interference effect, as did the external male and female groups.

The question that now presents itself is why the interference effect in the internal subgroup that showed the quickest learning in the escapable pretreatment and the most attempts to control the noise in the inescapable pretreatment?

The first possible answer is that this result was a fluke occurence, an answer that must be considered given the small sample size of this group. Unfortunately, Hiroto's findings are of no help here because he did not report any separate analysis for sex of subjects. He may or may not have obtained the same result.

The second possibility arises from a consideration of this finding in the context of the extended S-T helplessness model that incorporated attributional elements. It was suggested on page 143 that 50 inescapable trials may be sufficient to override the internals' more marked or prolonged activation and resistance phases (relative to externals) and that because they are more prone to blame themselves for their failure experiences, they may then manifest interference effects. Indeed, for this reason, and because task mastery is more likely to be important or ego-involving for this group, enhanced interference effects are likely.

From the results of the inescapable internal females, it appears that there were insufficient trials to take this group beyond the resistance phase. How then could there have been sufficient to achieve this in the internal male group? The way in which this might conceivably have come about is discussed in relation to Figure 17. This diagram sums up predictions generated by the S-T helplessness model and how the present findings might be related to it.

<u>FIGURE 17</u>. The extended S-T helplessness model.

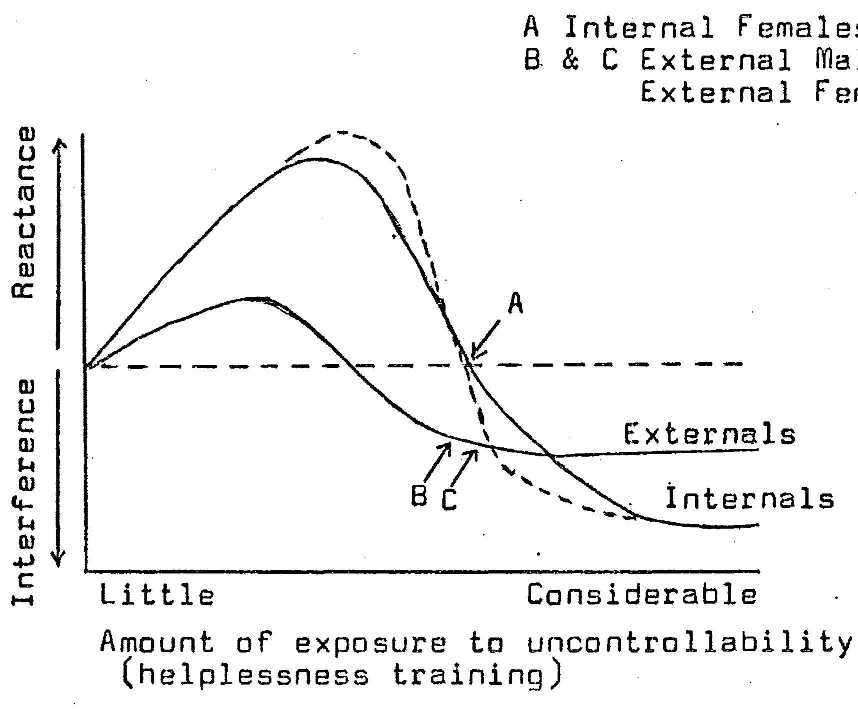


Figure 17 shows the postulated relationship between locus of control and helplessness training. Given that internals and externals are exposed to aversive uncontrollable outcomes that are of some importance, the cause of which is somewhat ambiguous, then the theory summarized on pages 131-134 suggests the relationship between locus of control and amount of helplessness training portrayed on

Figure 17 will obtain.

Thus, faced with small amounts of uncontrollability, internals will display more reactance (active attempts to reassert control when placed in another situation), as well as more active attempts in the training situation itself, than externals because of higher initial expectancies of control, higher achievement motivation (which has the effect of increasing task importance or ego-involvement), and perhaps also because of a tendency to attribute their initial failure to lack of effort.

In contrast to the above account, given the same amount of helplessness training, externals are more prone to give up and swing into an interference phase. However, with greater exposure to uncontrollability, internals too will manifest interference as their heightened efforts to control the situation continue to prove futile. Because the task has greater importance to them, because they tend to attribute the failure to themselves (when the cause is ambiguous), and possibly because their increased striving provided them with larger amounts of failure experience, they are hypothesized to display greater interference than are externals for whom the task is less important and the outcome of which is more likely to be seen as controlled by outside agents.[1]

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1. Although the experiment conducted in this thesis was not set up to test the attribution aspect of this model, data from the post experimental questionnaire appears to have some bearing on it. Although all inescapable groups considered the pretreatment task to be equally uncontrollable, only the external groups were found to

(continued at the foot of the following page)

The letters A, B, and C on Figure 17 indicate the probable positions of three of the inescapable groups in relation to the expanded model just outlined. That is to say, given the same amounts of inescapable noise, the two external groups showed interference effects and the internal females showed neither reactance nor interference. Presumably, a little more helplessness training would have taken the latter group into the interference category, somewhat less training, into the reactance category. The question remaining is why, given the same amount of training as these three groups, did the internal male group evidence interference?

There is some evidence from the pretreatment findings that suggests the internal males were more highly motivated to master the pretreatment task than the internal females. Other studies (see pp 94, 95) have found that males have greater expectancies of success on skill tasks. It could be that such differences added to similar tendencies associated with internality. Additionally, other research has been mentioned that shows males tend to hold themselves more responsible for skill-task outcomes than do females. Thus, it could be that these effects deriving from a trait additional to locus of control, had the effect of making this group more prone to interference? This may appear contradictory as the characteristics listed above (with the exception of attribution differences) are those that have been considered

(1. continued from p 207.)
report more anger towards the experimenter having been experienced during the anagrams task. Admittedly the evidence is indirect, however, it seems reasonable to speculate that the increased anger was a result of the external group showing a greater tendency to blame the experimenter for their inability to control the noise.

to heighten reactance. What may have happened however, is that even though the point at which the realization of the futility of responding came later among the internal males, the downswing into interference was more rapid due to increased ego involvement and possibly also an increased tendency to attribute cause of failure to their own incompetence. This hypothetical function is plotted as a dashed line in Figure 17.

The above account, although plausible, is both post hoc and speculative. As indicated earlier, the result may simply have been fortuitous. Further, this proposal to account for the internal male result raises, but does not answer, the question of why this did not also occur with the external males. Clearly, there is a need for a replication of this aspect of the experiment with larger sample sizes. Experimentation with more obviously sex-typed tasks would also be expected to help clarify this proposition.

The more detailed analysis of the mastery effect indicated that it only reached significance in the internal female group although it approached significance on some of the dependent variables in the two external groups. The nature of mastery effects has been largely ignored to date in the literature. It would seem that they are analogous to interference effects. I.e.,experience of control on one task leads to a set or expectancy of control that generalizes to enhance performance on other tasks.

Another possible explanation for mastery effects is increased arousal in this group relative to no pretreatment controls. This position is not supported by the subjective stress results of the present experiment. Indeed, one of the escapable groups evidenced a significant decrease in stress or arousal following escapable pretreatment.

A further aspect of mastery is how it relates to locus of control. It may be that the failure to produce this effect in internal males in the present study was due to a ceiling effect - their expectations of control may already have been so high that the escapable pretreatment made no appreciable difference. The internal females may have responded because the ceiling was not reached. Perhaps, although having general expectancies of control, these did not generalize to the skill task situation to the extent of the male group. However, when given success experience, they may have quickly developed mastery expectancies. The reduced, nonsignificant effects typifying the two external groups may have been due to this trait increasing the threshold for experiencing mastery effects in a way analogous to that proposed for internals with respect to interference?

The importance of mastery effects in the interpretation of the results of the triadic design was discussed in the previous chapter. The main point was the way that the presence of mastery inflates spuriously the contrasts typically used to demonstrate interference. This potential for confounding (and often this reality) is typically overlooked in the literature. Indeed, the virtues of the triadic design and these very contrasts are frequently heralded. However, large distortions can be the result. For example, Hiroto and Seligman (1975) reported interference effects on almost one hundred percent of the fifteen controllable vs uncontrollable contrasts performed on the results of their series of experiments. This dropped to fifty percent when the no pretreatment vs uncontrollable contrasts were conducted. The point has now been well made that controllable noise or solvable problems do not produce interference. The point of the controllable group and the triadic design is now questionable, unless one wishes to study both mastery and interference effects.

Subjective Stress Effects.

The findings outlined in the last chapter indicated that although there were no differences between the various escapable and inescapable groups in terms of how aversive they considered the noise to be, the effects of the pre-treatment on subjective ratings of arousal gave a pattern that paralleled closely the anagrams performance. I.e., the groups that indicated they felt the most stressed were those that showed impaired anagrams performances, namely the internal males and two external groups from the inescapable condition. The groups that did not show cognitive and motivational impairment also failed to manifest increased stress. This correspondence was predicted (hypothesis 2, p 144). The apparent discrepancy between the noise ratings and the subjective experience of stress is consistent with previous research and the present writer's suggestion that it is not the noise per se that is stressful, but the information it conveys to the subject and how this information is structured.

The finding of higher stress ratings among external males prior to receiving pretreatment relative to internal males is consistent with previous research. The reversal of this in the female groups was unexpected. No obvious explanation is available. One possibility is that the possession of extreme internal attitudes among females is counter to traditional role expectations for woman in New Zealand society and that the possession of this orientation creates some difficulties for late adolescent girls.

Generalization

The second major aim of this thesis was to provide information on the neglected issue of generalization. This neglect has been a major weakness of LH research. It has meant that not only is there some doubt as to whether bone fide interference has been demonstrated in man, it also weakens the claim that interference provides a model for some 'real-life' depressive episodes - states characterized by their wide effects upon behaviour in a variety of settings.

The present findings have shown for the first time that a pretreatment which is commonly used in the human LH research will produce cognitive-motivational deficits of a similar magnitude when the same post-test task is presented as part of a separate experiment and when it is presented in the usual way (i.e. as part of the same experiment). These results support predictions from early LH theory that the effect produced by uncontrollability has broad generality across situations. Wortman et al (1976) also presented the post-test in both the situations employed in the present study and appear to have shown a similar generality for the other outcome of experience with uncontrollability, reactance.

An implication of both sets of findings mentioned in the previous paragraph is that experiments that tested in the same situation as that in which pretreatment was administered (the vast majority of previous studies) can probably be regarded as useful investigations of interference and reactance phenomena. This is because had the testing been conducted in a more dissimilar situation, the outcome would probably have been much the same. However, further replications are needed to strengthen this argument. It needs to also be noted that the present experimental findings only extend to externals.

Because subjective stress ratings were also made by the two inescapable external groups in the two different post test settings, some preliminary data was obtained on the generalization of this interference effect. The results suggest that although still evident in the separate experiment post test setting, the subjective concommitants are reduced. Thus, it may be that the subjective and cognitive-motivational components generalize to different extents. Because the separate experiment testing occurred after a slightly longer interval from pretreatment (in spite of efforts to keep them the same), it may instead indicate different time functions for their dissipation. Irrespective of why, the possibility that they do not necessarily have to coexist is of interest in its own right.

PHYSIOLOGICAL CORRELATES

Although the physiological results have to be considered with caution because of subject loss and large within cell variability, they are of considerable interest.

The wide individual variability in response to the aversive noise pretreatments is typical of the great majority of studies that have looked at physiological reactions to environmental manipulation .

In spite of the variable individual responses, in most conditions there was a tendency for habituation to occur over time. On the heart rate measure, although there was a tendency for this decrease in arousal to be more evident in the inescapable groups, escapable-inescapable differences were not significant over the final phase of pretreatment where they were largest. This finding of nonsignificant differences between these two groups on the HR measure is now one of the few well-established findings in the small literature of physiological correlates of interference. This is the third study to obtain this result (see the physiological section in Chapter 3).

There were also no differences between the escapable and inescapable groups on the PPV index, when these groups were considered as a whole. However, when locus of control was considered, differences emerged. Inecapable internals became more aroused on this measure. This finding probably reflects their increased concern to master the task and is consistent with the greater efforts this group made during the inescapability pretreatment to control the noise. As this group did not show more arousal on the HR index, this is a further illustration of a fractionation of physiological responding noted in association with helplessness training by Gatchel and Procter (1976).

On the HR measure, but not on PPV, an overall internal -external difference was found with the externals being more aroused, particularly over the earlier trials. This was predicted from the hypothesis that externals would experience more initial anxiety because of higher expectancies of failure. It could also be due to their higher trait anxiety. This has been shown to be associated with externality in a male New Zealand sample although the results of the present study suggested this may not be so for females.

CHAPTER IX. SUMMARY, CONCLUSIONS, AND IMPLICATIONS FOR FUTURE RESEARCH

SUMMARY & CONCLUSIONS

In the context of a critical review of the learned helplessness literature, it was argued that although the LH concept and theory has had considerable heuristic value, the concept lacks consistency of usage and definitional precision. It was suggested that although these qualities had the effect of bringing a variety of areas of investigation into an interesting juxtaposition, an important function of a theory at the formative stages, the formulation was at the same time too broad to generate precise predictions. In addition to this loose fit between procedural definitions of LH and predicted outcomes, the theory was also criticized on the grounds of inadequate specification of boundary conditions - how far the effect should generalize.

A review of the animal literature indicated that LH theory has been seriously challenged by both physiological and S-R theories. It was shown that these issues do not impinge upon the human experimentation. To the contrary, evidence for the central expectancy mechanism proposed by the LH model as a necessary cause for interference was shown to be strong at the human level. Although in this sense LH theory was considered to be more appropriate to the human situation than to the animal work, from the review of the human literature, it was argued that a number of additional theoretical inputs to the original LH position were necessary to adequately embrace the added complexity of the human findings.

It was suggested that a more satisfactory state model of interference in man is provided by Wortman and Brehms' (1975) framework, a composite of LH and Reactance Theory. It was also shown that there was a need to qualify this extended model further by the addition of an attributional component.

Further theory building was inspired by recent demonstrations that behavioural outcomes can be more adequately predicted when both situational (state) and organismic (trait) factors are considered simultaneously. This type of approach has been shown to be productive in the field of anxiety and acknowledged to be lacking in studies of depression, the psychopathological state that LH is claimed to provide a laboratory model of. To this end, following Hiroto's (1974) lead, locus of control was investigated for its potential value in the formulation of a S-T helplessness model.

A review of the locus of control literature indicated that this trait construct fed into the expanded state model in a more complex way than was initially envisaged by Hiroto with respect to the original LH position. Internality and Externality were both shown to have interference resisting and interference predisposing attributes. From these considerations, a tentative S-T helplessness model was proposed. Sex differences, a neglected area to date in the helplessness literature, were also considered in relation to the extended state model.

Apart from the theoretical shortcoming of a lack of statements regarding the degree of generalization of interference (and reactance) effects in both the original LH model and the expanded framework, it was shown that the vast majority of human experiments have tested for interference effects in the context of the same experiment in which helplessness training was given. Not only does this provide limited information on generalization, it is doubtful whether such studies can be considered as bone fide demonstrations of interference, an effect defined in terms of an inappropriate generalization from one situation to another.

The experimental work conducted by the writer and outlined in the thesis was primarily addressed to the two major problem areas identified in the human helplessness literature - the lack of fit between theory and outcome and the generalization question. The first issue was approached by looking at the role of sex and locus of control in relation to the effects of helplessness training. The second was approached by a test of the hypothesis that interference effects would be similar when the same post treatment test task was presented as both part of the same experiment and in the context of a 'separate' experiment.

The main findings of the experiment were as follows.

1. When the post test task was presented as a part of the same experiment with the effects of sex and locus of control disregarded:
   a) exposure to 50 6-second inescapable noise bursts produced a deficit in anagram task performance (interference effect) relative to both yoked inescapable and no noise control groups.
   b) the escapable group showed facilitated responding (mastery effect) on two of the three anagrams dependent variables, relative to the no noise group.

2. Both sex and locus of control modified the effects of helplessness and mastery training in the groups considered in 1.
   a) Disregarding sex, cognitive-motivational deficits were evident on the anagrams performance of inescapable externals but not inescapable internals.
   b) With sex considered:
      i. the effects indicated in 1a were found to characterize external males and females and internal males, but not internal females.
      ii. facilitated performance (noted in 1b) was found in the escapable internal female group only.

3. The experimental groups that evidenced cognitive-motivational interference (see 2bi) also indicated that they experienced significantly more subjective stress following pretreatment than they had felt prior to this manipulation. The internal female group showed no change in this direction, as was also the case in the escapable and no noise groups.

4. When the anagrams post test task was presented in the context of a 'separate' experiment, inescapable subjects evidenced deficits of a similar magnitude to those found in a matched group that had received the anagrams task as a part of the same experiment in which they had received inescapable pretreatment.

5. Subjective stress ratings were increased in the inescapable (separate experiment) group relative to no noise and escapable noise groups but still remained lower than the inescapable noise (same experiment) group.

Secondary findings of the experiment were:

1. In the escapable pretreatment task, internal subjects were found to learn to escape the aversive noise more rapidly than externals. This difference was most evident between the male groups.

2. In the inescapable pretreatment task, internals made significantly more attempts to control the noise than did externals.

3. Inescapable externals indicated that they felt more anger towards the experimenter during the pretreatment task than did the inescapable internals and the subjects in the escapable conditions.

4. External males indicated higher initial (before pretreatment) subjective stress ratings than internal

males. The reverse was the case with the female subjects.

Findings 1 to 4 of this section generally supported the construct validity of the I-E Scale and provided information that assisted the interpretation of the post-test findings.

5. The following summary conclusions can be made from the physiological recordings taken during pretreatment:
   a) large individual differences occurred in response to escapable and inescapable noise within all experimental groups.
   b) no overall differences occurred between escapable and inescapable groups on the two physiological measures.
   c) when locus of control was considered in relation to the manipulations mentioned in 5b, differences were found on the PPV measure with inescapable internals becoming more aroused over time relative to both their initial scores and inescapable externals.
   d) externals had significantly higher heart rates throughout pretreatment than did internals. The differences were greater over the early stages.

6. Post experimental questionnaire results suggested that the results were not due to the operation of unforeseen demand characteristics.

The specific implications of each of these sets of findings in terms of theory and past research were given in the previous chapter and will not be repeated here.

In very general terms however, the results clearly indicate that organismic factors influence individual reactions to both the experience of controllable and uncontrollable aversive outcomes and that by considering such trait-state interactions more precise theoretical predictions can be generated. I.e.,the findings of the present investigation support the argument made on theoretical grounds that by formally including trait variables into our models of learned helplessness, some of the 'noise' or looseness of the earlier state models can be reduced.

The other important implication of the current study is the suggestion that the majority of previous LH studies would probably have obtained similar results had they presented the post-test as a part of a separate experiment. In other words, as originally posited by Seligman, the LH effect does have generality. This supports its claim to provide a model for depression. One spin-off of the present experimentation was the possibility that the different components of the interference effect (e.g. the cognitive-motivational and the subjective stress effects) have different generalization gradients.

IMPLICATIONS FOR FUTURE RESEARCH

The theoretical discussions and the results from the experiment reported in this thesis suggest a very wide variety of research possibilities. Apart from the more general suggestions given above, a number of specific areas can be identified. A number of these are listed below. Further comment and discussion of some of them is found in the previous chapter.

Suggestions for future research:

1. Factorial studies varying the different variables (e.g. task importance, amount of helplessness training) specified by the extended state model.

2. A replication of the present experiment with larger numbers of subjects in the no pretreatment and inescapable noise conditions to determine whether the sex x locus of control interaction was fortuitous.

3. An investigation of the interaction between sex, locus of control and mastery training using larger cell sizes. One hypothesis to be investigated here is the possibility from the present study that externality increases the the threshold for the manifestation of mastery effects.

4. Studies concerning the interaction between locus of control and varying amounts of helplessness training or manipulations of pretest task importance to evaluate predictions from the S-T Helplessness model.

5. Studies of the causal attributions that internals and externals make following ambiguously determined success and failure experiences and how this relates to post-test performance.

6. An investigation into whether mastery experiences given prior to inescapable pretreatment will modify interference thresholds in the way that internality appears to. The importance of the two experiences could also be manipulated either directly or indirectly (e.g. by using sex-typed tasks with mixed subject groups).

7. A study to determine whether defensive externals are more resistant to interference than both internals and other externals as theory suggests.

8. An investigation into whether mastery experiences provided after helplessness training will reverse interference effects. Locus of control could also be varied to determine whether this modifies proneness to respond to this 'therapy'. Again task importance could be varied.

9. Further research into the generalization of interference effects including the possibility raised in the present study that the generalization gradients differ for the subjective stress and cognitive-motivational effects. How these relate to the generalization of physiological changes is also in need of investigation. It would be useful if the cognitive-motivational effects could be more adequately separated than they have in the past.

10. Further work into the physiological concommitants

of helplessness training is also indicated. The evidence from both the present experimentation and Gatchel and Procters' (1976) work of a fractionation of physiological responding with both activation and deactivation responses present at the same time is of considerable theoretical interest. Work along these lines could be expected to help clear up the current very confused state that exists in the field of research that has attempted to separate anxiety and depression states by physiological means.

BIBLIOGRAPHY

Abbott,M.W. Transcendental Meditation as a therapeutic technique: A place on the Behaviour Modifier's armoury? Unpublished paper, 1975.

Adams-Webber,J.R. Generalized expectancies concerning the locus of control of reinforcements and the perception of moral sanctions. British Journal of Clinical Psychology, 1969, 8, 340-343.

Akiskal,H.S.,& McKinney,W.T. Depressive disorders: Toward a unified hypothesis. Science, 1973, 182, 20-29.

Akiskal,H.S.,& McKinney,W.T. Overview of recent research in depression. Archives of General Psychiatry, 1975, 32, 3, 285- .

Altrocchi,J.,Palmer,J.,Hellmann,R.,& Davis,H. The Marlowe-Crowne, Repressor-Sensitizer, and Internal-External Scales and attribution of unconscious hostile intent. Psychological Reports, 1968, 23, 1229-1230.

Abramowitz,S.I. Locus of control and self-reported depression among college students. Psychological Reports, 1969, 25, 149-150.

Anisman,H. Effects of pretraining compatible and incompatible responses on subsequent one-way and shuttle-avoidance performance in rats. Journal of Comparative and Physiological Psychology, 1973, 82, 95-104.

Anisman,H.,& Waller,T.G. Facilitative and disruptive effect of prior exposure to shock on subsequent avoidance performance. Journal of Comparative and Physiological Psychology, 1972, 78, 113-122.

Anisman,H.,& Waller,T.G. Effects of inescapable shock on subsequent avoidance performance: Role of response repertoire changes. Behavioural Biology, 1973, 9, 331-355.

Averil,J.R. Personal control over aversive stimuli and its relationship to stress. Psychological Bulletin, 1973, 80, 286-303.

Bainbridge,P.C. Learning in the rat: Effect of early experience with an unsolvable problem. Journal of Comparative and Physiological Psychology, 1973, 82, 301-307.

Barabasz,A. Recent Advances in Behaviour therapy and hypnosis. In press, 1977.

Battle,E.,& Rotter,J.B. Children's feelings of personal control as related to social class and ethnic group. Journal of Personality, 1963, 31, 482-490.

Beck,A.T. Depression: Clinical, experimental, and theoretical aspects. New York, Hoeber, 1967.

Becker,J. Depression: Theory and Research. Washington D.C., Winston & Sons, 1974,

Bensen,J.S.,& Kennelly,K.J. Learned helplessness: The result of uncontrollable reinforcements or uncontrollable aversive stimuli? Journal of Personality and Social Psychology, 1976, 39, 138-145.

Bergin,A.E.,& Garfield,S.L. (Ed.) Handbock of Psychotherapy and behaviour change: An empirical analysis. New York, Wiley & Sons, 1971.

Bettelheim,

Bialer,I. Conceptualization of success and failure in mentally retarded and normal children. Journal of personality, 1961, 29, 303-320.

Bibring,E. The mechanism of depression. In P. Greenacre (ED.), Affective disorders. New York: International Universities Press, 1953. 13-48.

Bowers,K.S. Situationalism in Psychology: An analysis and a critique. Psychological Review, 1973, 80, 307 - 336.

Brady,J.V.,Porter,R.W.,Conrad,D.G., & Mason,J.W. Avoidance behaviour and the development of gastro-duodenal ulcers. Journal of the Experimental Analysis of Behaviour, 1958, 1, 69-72.

Bracewell,R.J.,& Black,A.H. The effects of restraint and noncontingent pre-shock on subsequent escape learning in the rat. Learning and Motivation, 1974, 5, 53-69.

Bradshaw,P.W.,& Housely,P. Personal correspondence.

Braud,W.,Wepmann,B.,& Russo,D. Task and species generality of the "helplessness" phenomenon, Psychonomic Science, 1969, 16, 154-155.

Burgess,E.P. The modification of depressive behaviours. In R.D. Rubin & C.M. Franks (Eds.), Advances in behaviour therapy. New York, Academic Press, 1968, 193-199.

Calhoun, L.G., Cheney, T., & Dawes, A.S. Locus of control, self reported depression, and perceived causes of depression. J. consult. clin. Psychol., 1974, 42, 861-865.

Carlson, R. Where is the person in personality research? Psychological Bulletin, 1971, 75, 203-219.

Carver, C.S. Attribution of success as a function of locus of control and objective self-awareness. Bulletin of the Psychonomic Society, 1976, 7, 358-360.

Catania, A.C. Elicitation, reinforcement, and stimulus control. In Glaser (Ed.), The nature of reinforcement. New York: Academic Press, 1971.

Cattell, R.B. Personality. New York, McGraw-Hill, 1950.

Cattell, R.B. The scientific analysis of personality. Penguin Books Ltd., 1967.

Chance, J.E. Internal control of reinforcements and the school learning process. Paper read at the Society for Research in Child Development meeting, Minneapolis, March, 1965.

Chodoff, P., Friedman, S., & Hamburg, D. Stress defences and coping behaviour. American Journal of Psychiatry, 1964, 120, 743-749.

Church, R.M. Systematic effect of random error in the yoked control design. Psychological Bulletin, 1964, 62, 122-131.

Church, R.M. Response Suppression. In B.A. Campbell and R.M. Clark (Eds.), Punishment and aversive behaviour. New York: Appelton-Century-Crofts, 1968, 111-156.

Clouser, R.A., & Hjelle, L.A. Relationship between locus of control and dogmatism. Psychological Reports, 1970, 26, 1006.

Cofer, C.N., & Appley, M.H. Motivation: Theory and research. New York, Wiley, 1964.

Coleman, J.S., (and others). Equality of educational opportunity, Report from the office of education. Washington D.C.: U.S. Government Printing Office, 1966.

Collins, B.E. Four components of the Rotter I-E scale... Journal of Personality and Social Psychology, 1974, 29, 381-391.

Costello, C.G. Depression: Loss of reinforcers or loss of reinforcer effectiveness? Behaviour Therapy, 1972, 3, 240-247.

Crandall,V.C.,Katkovsky,W.,& Crandall,V.J. Children's belief in their control of reinforcement in intellectual-academic achievement situations. Child Development, 1965, 36, 91-109.

Crandall,V.C.,Katkovsky,W.,& Preston,A. Motivational and ability determinants of young children's intellectual achievement behaviours. Child Development, 1962, 33, 643-661.

Daeux,K.,White,L.,Farris,E. Skill versus luck: Field and Laboratory studies of male and female preferences. Journal of Personality and Social Psychology, 1975, 32, 629-636.

Davis,D.E. Internal-external control and defensiveness. Unpublished doctoral dissertation, Kansas State University, 1970.

Davis,W.L.,& Phares,E.J. Internal-External control as a determinant of information-seeking in a social influence situation. Journal of Personality, 1967, 35, 547-561.

Davis,W.L.,& Phares,E.J. Parental antecedents of internal-external control of reinforcement. Psychological Reports, 1969, 24, 427-436.

Dies, R.R. Development of a projective measure of perceived locus of control. Journal of Projective Techniques and Personality Assessment, 1968, 32, 487-490.

Desiderato,O.,& Newman,A. Conditioned suppression produced in rats by tones paired with escapable or inescapable shock. Journal of Comparative and Physiological Psychology, 1971,77, 427-443.

Douvan,E.,& Adelson,J. The adolescent experience. John Wiley & Sons, Inc.,1966.

Durham,R.C. Behavioural treatments of depression. Unpublished MPhil dissertation, University of London, 1972.

Dweck,C.S. The role of expectations and attributions in the alleviation of learned helplessness. Journal of Personality and Social Psychology, 1975, 31, 674-685.

Dweck,C.S.,& Repucci,N.D. Learned helplessness and reinforcement responsibility in children. Journal of Personality and Social Psychology, 1973, 25, 109-116.

Efran,J.S. Some personality determinants of memory for success and failure. Dissertation Abstracts, 1964, 24, 4793-4794.

Eisenman,R.,& Platt,J.J. Birth order and sex differences in academic achievement and internal-external control. Journal of General Psychology, 1968, 78, 279-285.

Elmes,D.G.,Jarrard,L.E.,& Swart,P.D. Helplessness in hippocampectomized rats: Response perseveration? Physiological Psychology, 1975, 3, 51-55.

Ekehammer,B. Interactionism in personality from a historical perspective. Psychological Bulletin, 1974, 81, 1026-1048.

Engel,G.L. A life setting conducive to illness: The giving-up-given-up complex. Annals of Internal Medicine, 1968, 69, 293-300.

Engberg,L.A.,Hansen,G.,Welker,R.L.,& Thomas,D.R. Aquisition of key-pecking via autoshaping as a function of prior experience: "Learned Laziness"? Science, 1973, 178, 1002-1004.

Eysenck,H.J. (Ed.) Handbook of Abnormal psychology. Belfast, Universities Press, 1973.

Eysenck,H.J. The classification of depressive illness. British Journal of Psychiatry, 1970, 117, 241-271.

Feather,N.T. Some personality correlates of external control. Australian Journal of Psychology, 1967, 19, 372-386.

Feather,N.T. Valence of outcome and expectation of success in relation to task difficulty and perceived locus of control. Journal of Personality and Social Psychology, 1967, 7, 372-386.

Feather,N.T. Change in confidence following success or failure as a predictor of subsequent performance. Journal of Personality and Social Psychology, 1968, 9, 38-46.

Feigl,H. The scientific outlook: Naturalism and humanism. In Feigl, H. & Brodbeck,M. (Eds.), Readings in the philosophy of science. New York, Appleton-Century-Crofts, 1953.

Ferster,C.B. Animal behaviour and mental illness. Psychological Record, 1966, 16, 345-356.

Ferster,C.B. A functional analysis of depression. American Psychologist, 1973, 28, 857-870.

Ferster,C.B.,& Skinner,B.F. Schedules of reinforcement. New York, Appleton-Century-Crofts, 1954.

Fosco,E.,& Geer,J. Effects of gaining control over aversive stimuli after differing amounts of no control. Psychological Reports, 1971, 29, 1153-1154.

Franklin,R.D. Youth's expectancies about internal versus external control related to N variables. Unpublished doctoral dissertation, Ohio State University, 1962.

Friedman,R.,& Katz,M.M. (Eds.) The psychology of depression: Contemporary theory and research. John Wiley & Sons, London, 1974.

Furneaux,W.D. Intellectual abilities and problem solving behaviour. Handbook of Abnormal Psychology (Ed. H.J. Eysenck, London: Pitman Medical, 1961).

Garret,H.E. Statistics in psychology and education. New York, Longmans,Green and Co.,1955.

Gamzu,E.R.,Williams,D.A.,& Schwartz,B. Pitfalls of organism and concept:"Learned laziness"? Science, 1973, 101, 367-368.

Gatchel,R.J.,& Proctor,J.D. Physiological correlates of learned helplessness in man. Journal of Abnormal Psychology, 1976, 85, 27-34.

Geer,J.H.,Davidson,G.C.,& Gatchel,R.I. Reduction of stress in humans through nonveridical perceived control of aversive stimulation. Journal of Personality and Social Psychology, 1970, 16, 731-738.

Glass,D.C.,Singer,J.E.,Skipton Leonard,H.,Krantz,D. Perceived control of aversive stimulation and the reduction of stress responses.
1973

Glass,D.C.,& Singer,J.E. Urban Stress: Experiments on noise and social stressors. New York: Aacademic Press, 1972.

Glazer,H.I.,& Weiss,J.M. Long-term and transitory interference effects. Journal of Experimental Psychology: Animal Behaviour Processes, 1976, 2, 191-202. (a)

Glazer,H.I.,& Weiss,J.M. Long-term interference effects: An alternative to "learned helplessness". Journal of Experimental Psychology: Animal Behaviour Processes, 1976, 2, 203-213.

Gillis,J.S.,& Jessor,R. Effects of brief psychotherapy on belief in internal control: an exploratory study. Psychotherapy: Theory, Research, and Practice, 1970, 7, 135-137.

Gottesfield,H.,& Dozier,G. Changes in feelings of powerlessness in a community action program. Psychological Reports, 1966, 19, 978.

Greene,W.A.,Goldstein,S.,& Moss,A.J. Psychosocial aspects of sudden death. Archives of Internal Medicine, 1972, 129, 725-731.

Guilford,J.P. Personality. New York: McGraw-Hill, 1959.

Gurin,P.,Gurin,G.,Lao,R.,& Beattie,M. Internal-external control in the motivational dynamics of Negro youth. Journal of Social Issues, 1969, 25, 29-53.

Hannum,R.D.,Rosellini,R.A.,& Seligman,M.E.P. Retention and immunization of learned helplessness from weaning to adulthood. Developmental Psychology, in press.

Harlow,H.F.,& Griffith,G. Induced social and mental deficits in rhesus monkeys, in S.F.Osler and R.E. Cooke (Eds.), The Biosocial Basis of Mental Retardation, Johns Hopkins Press, 1965.

Harlow,H.F.,& Harlow,M.K. The affectional systems, in A.D.Schrier, H.F.Harlow, and F.Stollnitz (Eds.), Behaviour of Non-Human Primates, vol. 2, Academic press, 1965.

Harlow,H.F.,& Soumi, Induced depression in monkeys. Behavioural Biology, 1974, 112, 273-296.

Harrow,M.,& Ferrante,A. Locus of control in psychiatric patients. Journal of Consulting and Clinical Psychology, 1969, 33, 582-589.

Hersch,P.D.,& Scheibe,K.E. On the reliability and validity of internal-external control as a personality dimension. Journal of Consulting Psychology, 1967, 31, 609-614.

Hjelle,L.A. Internal-external control as a determinant of academic achievement. Psychological Reports, 1970, 26, 326.

Hiroto,D.S. Locus of control and learned helplessness. Journal of Experimental Psychology, 1974, 102, 187-193.

Hiroto,D.S.,& Seligman,M.E.P. Generality of learned helplessness in man. Journal of Personality and Social Psychology, 1975, 31, 311-327.

Hockreich,D.J. Defensive externality and blame projection following failure. Journal of Personality and Social Psychology, 1975, 32, 540-546.

Honig,W.K. (Ed.) Operant conditioning: Research and application. New York: Appleton-Century-Crofts, 1966.

Hunt,D.E.,& Hardt,R.H. The effect of Upward Bound programs on the attitudes, motivation, and academic achievement of Negro students. Journal of Social Issues, 1969, 25, 117-129.

Jackson,B. Treatment of depression by self-reinforcement. Behaviour Therapy, 1972, 3, 298-307.

James,W.H. Internal versus external control of reinforcement as a basic variable in learning theory. Unpublished doctoral dissertation, Ohio State University, 1957.

Janis,I.L.,& Leventhal,H. Human reactions to stress. In E.Borgotta and W.Lambert (Eds.), Handbook of personality theory and research. Chicago, Ill.: Rand McNally, 1968, 1041-1068.

Jenkins,H.M.,& Ward,W.C. Judgement of contingency between responses and outcomes. Psychological Monographs, 1965, 79, (Whole No. 594).

Joe,V.C. Review of the Internal-External control construct as a personality variable. Psychological Reports, 1971, 28, 619-640.

James,W.H.,Woodruff,A.B,& Werner,W. Effects of internal and external control upon changes in smoking behaviour. Journal of Consulting Psychology, 1965, 29, 184-186.

Katkovsky,W.,Crandall,V.C.,& Good,S. Parental antecedents of children's beliefs in internal-external control of reinforcements in intellectual achievement situations. Child Development, 1967, 38, 765-776.

Kelly,G.A. The psychology of personal constructs, 1 and 2. New York: Norton, 1955.

Klein,D.C.,Fencil-Morse,E.,& Seligman,M.E.P. Learned helplessness, depression, and the attribution of failure. Journal of Personality and Social Psychology, 1976, 33, 508-516.

Klein,D.C.,& Seligman,M.E.P. Reversal of Performance deficits and perceptual deficits in learned helplessness and depression. Journal of Abnormal Psychology, 1976, 85, 11-26.

Klinger,E. Consequences of Commitment to and disengagement from incentives. Psychological Review, 1975, 82, 1-23

Klinger,E.,Kemble,E.D.,& Barta,S.G. Cyclic activity changes during extinction in rats: A potential model for depression. Animal Learning and Behaviour, 1974, 2, 313-316.

Krantz,D.S.,Glass,D.C.,& Snyder,M.L. Helplessness, stress level, and the coronary-prone behaviour pattern. Journal of Experimental Social Psychology,1974, 10, 284-300.

Kurtz,K.H. Foundations of psychological research. Boston: Allyn & Bacon,Inc., 1966.

Lao,R.C. Internal-external control and competent and innovative behaviour among Negro college students. Journal of Personality and Social Psychology, 1970, 14, 263-270.

Lacey,J.I. Somatic response patterning and stress: Some revisions of activation theory. In M.Appley & R.Turnbull (Eds.), Psychological Stress: Issues in Research. New York: Appleton-Century-Crofts, 1967.

Lazarus,A.A. Learning theory and the treatment of depression. Behavioural Research and Therapy, 1968, 6, 83-89.

Lamont,J. Item mood-level as a determinant of I-E test response. Journal of Clinical Psychology, 1972, 28, 190. (a)

Lamont,J. Depression, locus of control, and mood response set. Journal of Clinical Psychology, 1972, 28, 342-345. (b)

Lefcourt,H.M. Internal versus external control of reinforcement: A review. Psychological Bulletin, 1966, 65, 206-220.

Lefcourt,H.M. Recent developments in the study of locus of control. In B.A.MAHER (Ed.), Progress in experimental personality research. New York: Academic Press, 1972.

Levine,M. Hypothesis behaviour by humans during discrimination learning. Journal of Experimental Psychology, 1966, 71, 331-338.

Levis,D.J. Learned helplessness: A reply and an alternate S-R interpretation. Journal of Experimental Psychology: General, 1976, 105, 47-65.

Levenson,H. Perceived parental antecedents of internal, powerful others, and chance locus of control orientations. Developmental Psychology, 1973, 9, 268-274.

Levenson,H. Activism and powerful others: Distinctions within the concept of internal-external control. Journal of Personality Assessment, 1974, 38, 377-383.

Levenson,H.,& Miller,J. Multidimensional locus of control in sociopolitical activists of conservative and liberal ideologies. Journal of Personality and Social Psychology, 1976, 33, 199-208.

Lewinsohn,P.M. A behavioural approach to depression. In R.J.Friedman & M.M.Katz, The psychology of depression: contemporary theory and research, New York: Winston & Sons, 1974.

Liddel,H.S. Emotional hazards in animals and man. Springfield, Illinois: The Free Press of Glencoe, 1953.

Lipp,L.,Kolstoe,R.,James,W.,& Randall,H. Denial of responsibility and internal control of reinforcement. Journal of Consulting and Clinical Psychology,1968,32,72-

Lubin,B. Adjective checklists for measurement of depression. Archives of General Psychiatry, 1965, 12, 57-63.

Lykken,D. Preception in the rat: Autonomic response to shock as a function of length of warning interval. Science, 1962, 137, 665-666.

Maier,S.F.,& Testa,T.J. Failure to learn to escape by rats previously exposed to inescapable shock is partly produced by associative interference. Journal of Comparative and Physiological Psychology, 1975, 88, 554-564.

Maier,S.F.,Seligman,M.E.P.,& Solomon,R.L. Pavlovian fear conditioning and learned helplessness. In Campbell,B. and Church,R.M.(Eds.) Punishment, New York: Appleton-Century-Crofts, 1969, 299-343.

Maier,S.F.,& Seligman,M.E.P. Learned helplessness: Theory and evidence. Journal of Experimental Psychology: General, 1976, 105, 3-46.

Marshall,T. Animal Models of Depression and Aversive Stimuli. 1975, Unpublished paper, Canterbury University.

Masserman,J.H. _Behaviour and Neurosis._ Chicago: University of Chicago Press, 1943.

McCarron,L.T. Psychophysiological discriminants of reactive depression. _Psychophysiology_, 1973, _10_, 223-230.

McCulloch,T.L.,& Bruner,J.S. The effect of electric shock upon subsequent learning in the rat. _Journal of Psychology_, 1939, _7_, 333-336.

McDonald,A.P. Internal-external locus of control: Parental antecedents. _Journal of Consulting and Clinical Psychology_, 1971, _37_, 141-147.

McClean,P.D.,Ogston,K.,& Grauer,L. A behavioural approach to the treatment of depression. _Journal of Behaviour Therapy and Experimental Psychiatry_, 1973, _4_, 323-330.

Merton,R.K. _Social theory and social structure_. Glencoe, Ill.: The Free Press, 1949.

Miller,W.R.,& Seligman,M.E.P. Depression and the perception of reinforcement. _Journal of Abnormal Psychology_, 1973, _82_, 62-73.

Miller,W.R.,& Seligman,M.E.P. Depression and learned helplessness in man. _Journal of Abnormal Psychology_,1975 _84_, 228-238.

Miller,W.R.,Seligman,M.E.P.,& Kurlander,H.M. Learned helplessness, depression, and anxiety. _Journal of Nervous and Mental Disease_,In Press.

Miller,W.R.,& Seligman,M.E.P. Learned helplessness, depression and the perception of reinforcement. _Behaviour Research and Therapy_, 1976, _14_, 7-17.

Miller,A.G.,& Minton,H.L. Machiavellianism, internal-external control, and the violation of experimental instructions. _Psychological Record_, 1969, _19_, 369-380.

Mirels,H.L. Dimensions of internal versus external control. _Journal of Consulting and Clinical Psychology_, 1970, _34_, 226-228.

Mischel,W. _Personality and assessment_. New York: Wiley, 1968.

Mischel,W.,Zeiss,R.,& Zeiss,A. Internal-external control and persistence: Validation and implications of the stanford preschool internal-external scale. _Journal of Personality and Social Psychology_, 1974, _29_, 265-278.

Moot,S.A.,Ceballa,R.P.,& Crabtree,J.M. Instrumental control and ulceration in rats. Journal of Comparative and Physiological Psychology, 1970, 71, 405-410.

Mowrer,O.H. Learning Theory and behaviour. New York: John Wiley, 1960.

Orne,M.T. On the social psychology of the psychological experiment: with particular reference to demand characteristics and their implications. American Psychologist, 1962, 17, 776-783.

Osgood,C.E. Method and theory in experimental psychology. New York: Oxford University Press, 1953.

Overmier,J.B.,& Seligman,M.E.P. Interference with avoidance behavior: Failure to avoid traumatic shock. Journal of Experimental Psychology, 1968, 78, 340-343.

Overmier,J.B.,& Seligman,M.E.P. Effects of inescapable shock upon subsequent escape and avoidance behaviour. Journal of Comparative and Physiological Psychology, 1967, 63, 23-33.

Nelson,P.C.,& Phares,E.J. Anxiety, discrepancy between need value and expectancy, and internal-external control. Psychological Reports, 1971, 28, 663-668.

Padilla,A.M. Effects of prior and interpolated shock exposures on subsequent avoidance learning by goldfish. Psychological Reports, 1973, 32, 451-456.

Padilla,A.M.,Padilla,C.,Ketterer,T.,& Giacalone,D. Inescapable shocks and subsequent avoidance conditioning in goldfish (Carrasius auratus). Psychonomic Science, 1970, 20, 295-296.

Palmer,R.D. Parental perception and perceived locus of control in psychopathology. Journal of Personality, 39, 420-431.

Pavlov,I.P. Conditioned reflexes. New York: Dover, 1927.

Payne,R.J. Alterations of Sidman avoidance baselines by CS paired with avoidable or unavoidable shock. Psychological Reports, 1972, 31, 291-294.

Petzel,T.P.,& Gynther,M.D. Effects of internal-external locus of control and skill or chance instructional sets on task performance. Journal of General Psychology, 1970, 82, 87-93.

Phares,E.J. Expectancy changes in skill and chance situations. Journal of Abnormal and Social Psychology, 1957, 54, 339-342.

Phares,E.J. Internal-external control and the reduction of reinforcement value after failure. Journal of Consulting and Clinical Psychology, 1971, 37, 386-390.

Phares,E.J. Locus of control: A personality determinant of behaviour. Morristown, N.J.: General Learning Press, 1973.

Phares,E.J.,& Lamiel,J.T. Relationship of internal-external control to defensive preferences. Journal of Consulting and Clinical Psychology, 1974, 42, 872-878.

Prociuk,T.J.,Breen,L.J.,& Lussier,R.J. Hopelessness, internal-external locus of control, and depression. Journal of Clinical Psychology, 1976, 32, 299-300.

Reimanis,G. Effects of experimental IE modification techniques and home environmental variables on IE. Paper presented at the meeting of the American Psychological Association, Washington D.C.,September, 1971.

Rescorla,R.A. Pavlovian conditioning and its proper control procedures. Psychological Review, 1967, 74, 71-79.

Rippere,V. Antidepressive behaviour: a preliminary report. Behaviour Research and Therapy, 1976, 14, 289-299.

Rosellini,R.,& Seligman,M.E.P. Learned helplessness and escape from frustration. Journal of Experimental Psychology: Animal Behaviour Processes, 1975, 1, 149-158.

Rosenman,R.H.,Friedman,M.,Straus,R.,Wurm,M.,Jenkins,C.D., & Messinger,H.B. Coronary heart disease in the western collaborative group study: A follow-up of two years. Journal of the American Medical Association, 1966, 196, 130-136.

Roth,S.,& Bootzin,R.R. Effects of experimentally induced expectancies of external control: An investigation of learned helplessness. Journal of Personality and Social Psychology, 1974, 29, 253-264.

Roth,S.,& Kubal,L. The effects of noncontingent reinforcement on tasks of differing importance: Facilitation and learned helplessness effects. Journal of Personality and Social Psychology, 1975, 32, 680-691.

Rotter, J.B. Social learning theory and clinical psychology. New York: Prentice-Hall, 1954.

Rotter, J.B. Generalized expectancies for internal versus external control of reinforcement. Psychological Monographs, 1966, 80, (Whole No. 609).

Rotter, J.B., Chance, J., & Phares, E.J. (Eds.). Applications of a social learning theory of personality. New York: Holt, Rinehart, & Winston, 1972.

Rotter, J.B. Some problems and misconceptions related to the construct of internal versus external control of reinforcement. Journal of Consulting and Clinical Psychology, 1975, 43, 56-67.

Schneider, J.H. Skill versus chance activity preference and locus of control. Journal of Consulting and Clinical Psychology, 1968, 32, 333-337.

Schwartz, G.E. Meditation as an altered trait of consciousness: Current findings on stress reactivity, attentional flexibility, and creativity. Paper presented at the 82nd Annual Convention of the American Psychological Association, New Orleans, September, 1974.

Secunda, S.K., Katz, M.M., Friedman, R.J., & Schuyler, D. The depressive disorders (Special Report (HSM) 73-9157: 1973). Washington, D.C.: U.S. Government Printing Office, 1973.

Seligman, M.E.P. Fall into helplessness. Psychology Today (British Ed.), April, 1975. (a)

Seligman, M.E.P. Helplessness. On depression, development, and death. San Fransisco: W.H. Freeman, 1975. (b)

Seligman, M.E.P., & Beagley, G. Learned helplessness in the rat. Journal of Comparative and Physiological Psychology, 1975, 88, 534-541.

Seligman, M.E.P., & Groves, D. Non-transient learned helplessness. Psychonomic Science, 1970, 19, 191-192.

Seligman, M.E.P., & Johnston, J.C. A cognitive theory of avoidance learning. In F.J. McGuigan & D.B. Lumsden (Eds.), Contemporary approaches to conditioning and learning. Washington, D.C.: V.H. Winston, 1973.

Seligman, M.E.P., & Maier, S.F. Failure to escape traumatic shock. Journal of Experimental Psychology, 1967, 74, 1-9.

Seligman,M.E.P.,Maier,S.F.,& Geer,J. The alleviation of learned helplessness in the dog. Journal of Abnormal and Social Psychology, 1968, 73, 256-262.

Seligman,M.E.P.,Maier,S.F.,& Solomon,R.L. Unpredictable and uncontrollable aversive events. In F.R.Brush (Ed.), Aversive conditioning and learning. New York: Academic Press, 1971.

Seligman,M.E.P.,Rosellini,R.A.,& Kozak,M. Learned helplessness in the rat: Reversibility, time course, and immunization. Journal of Comparative and Physiological Psychology, 1975, 88, 542-547.

Sherrod,D.R.,& Downs,R. Environmental determinants of altruism: the effects of stimulus overload and perceived control on helping. Jnl.of Personality & Soc. Psychol., 1974, 10, 468-479.

Sines,J.O.,Cleeland,C.,& Adkins,J. The behaviour of normal and stomach lesion susceptible rats in several learning situations. Journal of Genetic Psychology, 1963, 102, 91-94.

Skinner,B.F. Science and human behaviour. New York: Macmillan, 1953.

Smith,R.E. Changes in locus of control as a function of life crisis resolution. Journal of Abnormal Psychology, 1970, 75, 328-332.

Smith,R.C.,& Lay,C.D. State and trait anxiety: an annotated bibliography. Psychological Reports, 1974, 34, 519-594.

Spiegel,D.,& Acker,C. Autonomic balance and reactivity in relation to indices of psychopathology on the M.M.P.I. Journal of Projective Techniques, 1967, 31, 76-80.

Spielberger,C.D. Theory and research on anxiety. In C. D.Spielberger (Ed.), Anxiety and Behaviour. New York: Academic Press, 1966.

Staddon,I.E.R.,& Simmelhag,V.L. The "superstition" experiment: A reexamination of its implications for the principles of adaptive behaviour. Psychological Review, 1971, 78, 3-43.

Stein,A.H.,Pohly,S.,& Mueller,E. The influence of masculine, feminine, and neutral tasks on children's achievement behaviour,expectancies of success, and attainment values. Child Development, 1971, 42, 195-207.

Stroebel, C.F. Biologic rhythm correlates of disturbed behaviour in the rhesus monkey. Bibliotheca Primatologica, 1969, 9, 91-105.

Thomas, D.R., Freeman, F., Svinicki, J.G., Burr, D.E.S., & Lyons, J. Effects of extradimensional training on stimulus generalization. Journal of Experimental Psychology Monograph, 1970, 83, (1, Pt.2).

Thomas, E., & Balter, A. Learned helplessness: Amelioration of symptoms by cholinergic blockage of the septum. Science, in press.

Thornton, J.W., & Jacobs, P.D. Learned helplessness in human subjects. Journal of Experimental Psychology, 1971, 87, 369-372.

Tolor, A., & Reznikoff, M. Relation between insight, repression-sensitization, internal-external control and death anxiety. Journal of Abnormal Psychology, 1967, 72, 426-430.

Tolman, E.C. Purposive behaviour in animals and man. New York: Appleton-Century-Crofts, 1932.

Tyron, W.W. Models of behavior disorder: A formal analysis based on Wood's taxonomy of instrumental conditioning. American Psychologist, 1976, 509-518.

Wagner, A.R. Stimulus selection and a "modified continuity theory". In G.H. Bower & J.T. Spence (Eds.), The psychology of learning and motivation (Vol. 3). New York: Academic Press, 1969.

Wagner, A.R., Rudy, J.W., & Whitlow, J.W. Rehearsal in animal conditioning. Journal of Experimental Psychology, 1973, 97, 407-426.

Wagner, G.A. A longitudinal study of changes in ego identity status and adjustment to airforce life during the first year at the airman cadet school. Unpublished M.A. Thesis, Victoria University of Wellington, 1975.

Weiss, J.M. Effects of coping responses on stress. Journal of Comparative and Physiological Psychology, 1968, 65, 251-260.

Weiss, J.M. Effects of coping behavior in different warning signal conditions on stress pathology in rats. Journal of Comparative and Physiological Psychology, 1971, 77, 1-13. (a)

Weiss, J.M. Effects of coping behaviour with and without a feedback signal on stress pathology in rats. Journal of Comparative and Physiological Psychology, 1971, 77, 22-30. (b)

Weiss, J.M. Effects of punishing the coping response (conflict) on stress pathology in rats. Journal of Comparative and Physiological Psychology, 1971, 77, 14-21. (c)

Weiss, J.M., Glazer, H.I., & Pohorecky, L.A. Coping behaviour and neurochemical changes: An alternative explanation for the original "learned helplessness" experiments. In Relevance of the psychopathological animal model to the human. New York: Plenum Press, 1975.

Weiss, J.M., Krieckhaus, E.E., & Conte, R. Effects of fear conditioning on subsequent avoidance behaviour. Journal of Comparative and Physiological Psychology, 1968, 65, 413-421.

Weiss, J.M., Stone, E.A., & Harrell, N. Coping behaviour and brain norepinephrine in rats. Journal of Comparative and Physiological Psychology, 1970, 72, 153-160.

Weiss, J.M., & Glazer, H.I. The effects of acute exposure to stressors on subsequent avoidance-escape behaviour. Psychosomatic Medicine, 1975, 37, 499-521. (a)

Weiss, J.M., Glazer, H.I., Pohorecky, L.A., Brick, J., & Miller, N. E. Effects of chronic exposure to stressors on avoidance-escape behaviour and on brain norepinephrine. Psychosomatic Medicine, 1975, 37, 522-534. (b)

Williams, C.B., & Vantress, F.E. Relation between internal-external control and aggression. Journal of Psychology, 1969, 71, 59-61.

Winer, B.J. Statistical principles in experimental design. New York, McGraw-Hill, 1971.

Wolpe, J., & Lazarus, A.A. The practice of behaviour therapy. New York: Permagon, 1969.

Wortman, C.B., & Brehm, J.W. Responses to uncontrollable outcomes: An integration of reactance theory and the learned helplessness model. In L. Berkowitz (Ed.), Advances in experimental social psychology. Vol. 8, 1975, New York: Academic Press, 277-336.

Wortman, C.B., Panciera, L., Shusterman, L., & Hibscher, J. Attributions of causality and reactions to uncontrollable outcomes. Journal of Experimental Social Psychology, 1976, 12, 301-316.

ERRATA:

(Missed from the Bibliography)

Davis, W. L., & Davis, D. E. Internal-external control and attribution of responsibility for success and failure. _Journal of Personality_, 1972, _40_, 123-135.

Goss, A., & Morosko, T. E. Relation between a dimension of internal-external control and the MMPI with an alcoholic population. _Journal of Consulting and Clinical Psychology_, 1970, _34_, 189-192.

McGinnies, E., Nordholm, L. A., Ward, C. D., Bhanthumnavin, D. L. Sex and cultural differences in perceived locus of control among students in five countries. _Journal of Consulting and Clinical Psychology_, 1974, _42_, 451-455.

Mischel, W. _Introduction to personality_. New York: Holt, Rinehart, & Winston, 1971.

Tresselt, M. E., & Mayzner, M. S. Normative solution times for a sample of 134 solution words and 378 associated anagrams. _Psychonomic Monograph Supplements_, 1966, _1_, 293-298.

Wagner, G. A. Personal communication, 1976.

Wilson, G. D., & Patterson, J. M. _Manual for the conservatism scale_. 1970: N.F.E.R., Windsor, England.

APPENDIX 1

RECORD OF AVERSIVE NOISE FROM ESCAPABLE NOISE GROUP SUBJECT AND THE SCHEDULE FOR THE DELIVERY OF AVERSIVE NOISE TO THE YOKED INESCAPABLE NOISE SUBJECTS.

Name: Experimental condition: I or E

Date:

Yoked to the following subjects:

_________________ Inescapable noise, Same Experiment.

_________________ Inescapable noise, Sep. Experiment.

Bursts	Duration of Burst	Time between Bursts
1.		
2.		9 seconds
3.		19 seconds
4.		11 seconds
5.		18 seconds
6.		12 seconds
7.		10 seconds
8.		16 seconds
9.		16 seconds
10.		8 seconds
11.		13 seconds
12.		16 seconds
13.		12 seconds
14.		20 seconds
15.		15 seconds
16.		11 seconds
17.		17 seconds
18.		8 seconds
19.		18 seconds
20.		20 seconds
21.		10 seconds
22.		15 seconds
23.		13 seconds
24.		15 seconds
25.		9 seconds

Bursts	Duration of Burst	Time between Bursts
26.		13 seconds
27.		19 seconds
28.		14 seconds
29.		14 seconds
30.		17 seconds
31.		12 seconds
32.		11 seconds
33.		19 seconds
34.		18 seconds
35.		10 seconds
36.		16 seconds
37.		20 seconds
38.		8 seconds
39.		17 seconds
40.		14 seconds
41.		11 seconds
42.		13 seconds
43.		17 seconds
44.		15 seconds
45.		20 seconds
46.		8 seconds
47.		12 seconds
48.		16 seconds
49.		18 seconds
50.		10 seconds

APPENDIX 2

ANAGRAM SCORE SHEET.

Name: Experimental condition:
Date: Experimenter:

Anagram		Word	Time to complete (100 sec. maximum)
1.	ouhlg	ghoul	
2.	mpyhn	nymph	
3.	niacp	panic	
4.	iardt	triad	
5.	oaltg	gloat	
6.	biath	habit	
7.	ulatf	fault	
8.	erlkc	clerk	
9.	acehb	beach	
10.	deolm	model	
11.	ugohc	cough	
12.	airnt	train	
13.	toanb	baton	
14.	cunri	incur	
15.	gaurs	sugar	
16.	utohy	youth	
17.	enrdt	trend	
18.	tailv	vital	
19.	awrlb	brawl	
20.	oulrf	flour	

Total time taken:

Mean response latency:
No. trials to criterion:
No. failures to solve:

Additional observations:

APPENDIX 3

Quickly check off how you feel right at this moment on the following scales. By placing a ring around the 1 or the 7 you indicate a strong feeling. The numbers 2 to 6 allow you to express less extreme feelings. Be sure to ring just one number on each scale.

Happy	1	2	3	4	5	6	7	Sad
Annoyed	1	2	3	4	5	6	7	Tranquil
In control	1	2	3	4	5	6	7	Helpless
Tense	1	2	3	4	5	6	7	Relaxed
Interested	1	2	3	4	5	6	7	Bored
Fatigued	1	2	3	4	5	6	7	Energetic
Satisfied	1	2	3	4	5	6	7	Frustrated
Depressed	1	2	3	4	5	6	7	Elated
Confident	1	2	3	4	5	6	7	Unconfident
Passive	1	2	3	4	5	6	7	Active
Enthusiastic	1	2	3	4	5	6	7	Indifferent
Angry	1	2	3	4	5	6	7	Placid
Competent	1	2	3	4	5	6	7	Incompetent
Anxious	1	2	3	4	5	6	7	Calm

APPENDIX 4

QUESTIONNAIRE

With regard to the following questions, if you ring the 1, your answer to the question is "yes" and you strongly accept the statement. Ringing the 7, on the other hand, means that your answer is "no" and that you strongly disagree with the statement. If you ring one of the other numbers, you indicate a lesser degree of acceptance or rejection.

1. Did you feel that no matter what you did you could not solve the button-pressing task?

1 2 3 4 5 6 7

2. Did you find the tone unpleasant?

1 2 3 4 5 6 7

3. Did you feel angry towards the experimenter during the button-pressing task?

1 2 3 4 5 6 7

4. Did you feel angry towards the experimenter during the anagrams task?

1 2 3 4 5 6 7

5. Did you find the anagrams task to be very difficult?

1 2 3 4 5 6 7

What do you think was the purpose of the study?

At the time you were doing the experimental tasks and the previous questionnaires, how do you think the experimenter expected you to do?

APPENDIX 5.

Escapable subjects pretest task performance: mean response latencies and failures to escape per 5-trial block.

Condition	Subjects	1 a	1 b	1 c	2 a	2 b	2 c	3 a	3 b	3 c	4 a	4 b	4 c	5 a	5 b	5 c
Internal Males (IM)	1	30	6	5	24	4.8	2	24.5	4.9	2	20	4	0	16.5	3.3	0
	2	21	4.2	2	14.5	2.9	0	14	2.8	0	15	3	0	13	2.6	0
	3	29	5.8	4	22.5	4.5	0	24.5	4.9	2	22.5	4.5	1	20	4	0
	4	30	6	5	27	5.4	3	20.5	4.1	0	20.5	4.1	0	22.5	4.5	0
	5	28	5.6	3	21.5	4.3	1	20.5	4.1	0	20.5	4.1	0	13	2.6	0
	TM 1		27.6			21.9			20.8			19.7			17	
	M 2			3.8			1.2			.8			.2			.2
Internal Females (IF)	1	29	5.8	4	15	3	0	17.5	3.5	0	15	3	0	14	2.8	0
	2	30	6	5	30	6	5	30	6	5	30	6°	5	30	6	5
	3	17	3.4	0	17.5	3.5	1	21.5	4.3	2	15	3	0	14.5	2.9	0
	4	30	6	5	18.5	3.7	3	22	4.4	0	17	3.4	0	15.5	3.1	0
	5	30	6	5	30	6	5	29	5.8	4	25	5	0	22	4.4	1
	TM 1		27.2			22.2			24			20.4			19.2	
	M 2			3.8			2.8			2.2			1			1.2
	TM 2		54.8			44.1			44.8			40.1			36.2	
External Males (EM)	1	30	6	5	30	6	5	30	6	5	27	5.4	3	25	5	0
	2	30	6	5	28	5.6	3	26.5	5.3	2	21.5	4.3	0	20.5	4.1	1
	3	30	6	5	30	6	5	30	6	5	30	6	5	30	6	5
	4	30	6	5	30	6	5	30	6	5	30	6	5	26.5	5.3	2
	5	30	6	5	28	5.6	4	20.5	4.1	0	20.5	4.1	0	18.5	3.7	0
	TM 1		30			29.2			27.4			24.7			21.9	
	M 2			5			4.4			3.4			2			1.2
External Females (EF)	1	30	6	5	30	6	5	30	6	5	30	6	5	30	6	5
	2	30	6	5	28	5.6	4	17	3.4	0	18	3.6	0	15	3	0
	3	24	4.8	2	24	4.8	1	20.5	4.1	0	17.5	3.5	0	13	2.6	0
	4	30	6	5	25	5	2	25	5	0	19.5	3.9	2	16.5	3.3	0
	5	30	6	5	30	6	5	30	6	5	24.5	4.9	1	16	3.2	0
	TM 1		28.8			27.4			24.5			21.9			18.1	
	M 2			4.6			3.6			2			1.6			1
	TM 2		58.8			56.6			51.9			46.6			40.0	

Condition	Subjects	6 a	6 b	6 c	7 a	7 b	7 c	8 a	8 b	8 c	9 a	9 b	9 c	10 a	10 b	10 c	Total noise received	Total failures to escape
Internal Males (IM)	1	16	3.2	0	18.5	3.7	1	16	3.2	0	17	3.4	0	15	3	0	197.5	10
	2	15.5	3.1	0	16	3.2	0	14	2.8	0	14	2.8	0	15.5	3.1	0	152.5	2
	3	23.5	4.7	0	24	4.8	2	14.5	2.9	0	14.5	2.9	0	18	3.6	0	213.0	9
	4	19.5	3.9	0	22	4.4	1	19.5	3.9	0	19.5	3.9	0	17	3.4	0	218.0	9
	5	16.5	3.3	0	12.5	2.5	0	16.5	3.3	0	16.5	3.3	0	15.5	3.1	0	181.0	4
	TM 1		18.2			18.6			16.1			16.3			16.2		962.0	34
	M 2			0			.8			0			0			0		
Internal Females (IF)	1	14.5	2.9	0	11	2.2	0	12.5	2.5	0	13	2.6	0	13	2.6	0	154.5	4
	2	30	6	5	25	5	0	21.5	4.3	0	20	4	0	17.5	3.5	0	264.0	25
	3	14	2.8	0	13	2.6	0	13.5	2.7	0	13.5	2.7	0	14	2.8	0	153.5	3
	4	15.5	3.1	0	14.5	2.9	0	14	2.8	0	19.5	3.9	0	15	3	0	181.5	8
	5	17.5	3.5	0	18.5	3.7	0	23	4.6	1	15.5	3.1	0	16	3.2	0	226.5	16
	TM 1		18.3			16.4			16.9			16.3			15.1		980.5	56
	M 2			1			0			.2			0			0		
	TM 2		36.5			35			33			32.6			31.3			
External Males (EM)	1	16.5	3.3	0	20	4	0	17	3.4	0	18	3.6	0	16.5	3.3	0	230.0	18
	2	21.5	4.3	1	17.5	3.5	0	22.5	4.5	1	23	4.6	1	22	4.4	1	233.0	14
	3	30	6	5	30	6	5	30	6	5	30	6	5	20.5	4.1	0	290.5	45
	4	18	3.6	0	19	3.8	0	14.5	2.9	0	17	3.4	0	18.5	3.7	0	218.0	22
	5	16	3.2	0	17.5	3.5	0	13.5	3.1	0	16	3.2	0	17	3.4	0	194.5	9
	TM 1		19.9			20.8			19.5			20.8			18.9		1166.0	108
	M 2			1.2			1			1.2			1.2			1		
External Females (EF)	1	30	6	5	30	6	5	30	6	5	30	6	5	30	6	5	300.0	50
	2	12.5	2.5	0	13.5	2.7	0	12	2.4	0	13	3	0	13.5	2.7	0	172.5	9
	3	14	2.8	0	15	3	0	15.5	3.1	0	18	3.6	0	16.5	3.3	0	177.5	3
	4	18	3.6	0	19	3.8	1	19.5	3.9	0	17.5	3.5	0	16.5	3.3	1	206.5	11
	5	16	3.2	0	16	3.2	0	14.5	2.9	0	15	3	0	18	3.6	0	210.0	16
	TM 1		18.1			18.7			18.3			18.7			18.9		1066.5	89
	M 2			1			1.2			1			1			1.2		
	TM 2		38.0			39.5			37.8			39.5			37.8			

a Total response latencies per 5-trial block
b Mean response latency per 5-trial block
c Total number of failures to escape noise per 5-trial block
TM 1 Total of mean response latencies
TM 2 Total of mean response latencies for 2 cell
M 2 Mean failures to escape noise

APPENDIX 6

PRETEST TASK PERFORMANCE: ANOVA SUMMARY TABLES.

TABLE 1. Analysis of Variance of overall failures to escape noise.

Source	df	MS	F
Between Sex (A)	1	28.8	.31
Between Locus of Control (B)	1	180	1.95
A x B	1	320	3.95*
Within Cell	16	92.53	

*p <.10

TABLE 2. Analysis of Variance of total noise received

Source	df	MS	F
Between Sex (A)	1	2531.25	1.3
Between Locus of Control (B)	1	7411.25	3.82*
A x B	1	26.45	.01
Within Cell	16	1940.91	

*p <.10

TABLE 3. Analysis of Variance of total mean response latencies, Trial block 1

Source	df	MS	F
Between Sex (A)	1	.13	.24
Between Locus of Control (B)	1	.8	1.48
A x B	1	.03	.06
Within Cell	16	.54	

Experimental Condition	Subject	Heart Rate 1	2	3	4	5	Peripheral Pulse Volume 1	2	3	4	5
EN Internal Males	1	72	63	63	60	63	46.5	57	51	49.5	58
	2	81	84	84	81	81	55.3	50	35	53	55
	3	96	102	90	87	84	33	15	16	19.5	17.5
	4	78	75	69	75	81	16	46	48	140	80.5
	5										
	Total	327	324	306	303	309	151	168	150	262	211
	Mean	81.75	81	76.5	75.75	77.25	37.75	42	30	65.5	52.75
EN Internal Females	1										
	2	87	87	84	84	84	34	61	40	19	6.5
	3	90	84	84	90	90	40.5	40.5	53.5	79	88
	4										
	5	93	96	96	96	96	55	79.5	55.5	42	41
	Total	270	267	264	270	270	129.5	180.67	149	140	135.5
	Mean	90	90	90	90	90	43.17	60.22	49.67	46.67	45.17
EN External Males	1	99	87	99	93	99	22.5	13	13	10	10
	2										
	3	126	117	117	120	114	25	14	15	6	7
	4	84	87	90	90	81	43	44.5	24	16.5	20.5
	5	66	63	57	60	57	25	21	40	62.5	130
	Total	375	352	363	363	351	118.5	92.5	92	95	167.5
	Mean	93.75	88.5	90.75	90.75	87.75	29.63	23.13	23	23.75	41.88
EN External Females	1	87	93	90	93	93	60.5	60.5	11	19	4
	2	96	93	93	93	93	35	45.5	67.5	127.5	150
	3	72	75	66	66	72	29.5	31.5	24.5	16.5	30
	4	117	114	108	105	102	43.5	25	42.5	26	27
	5	90	84	75	75	75	28.5	53.5	30	17.5	17.5
	Total	462	459	432	432	435	197	216	175.5	206.5	228.5
	Mean	92.4	91.8	86.4	86.4	87	39.4	43.2	35.1	41.3	45.7
InEN Internal Males	1	84	75	72	72	69	30	26	17	14.5	18
	2	108	111	90	90	84	14	13	8	7.5	7.5
	3	84	84	87	81	81	37.5	16.5	17	18.5	10.5
	4	87	84	84	78	84	36.5	50	44	32.5	31.5
	5	84	87	84	87	84	45.5	82	48.5	25.5	16
	Total	447	441	417	408	402	163.5	187.5	134.5	98.5	83.5
	Mean	89.4	88.2	83.4	81.6	80.4	32.7	37.5	26.9	19.7	16.7
InEN Internal Females	1	75	69	66	63	63	60.5	150	147	71	41
	2										
	3	84	84	78	75	72	47	77.5	47	49	19.5
	4	93	96	75	90	90	42	48.5	70	53	50.5
	5	93	111	99	99	93	22.5	40	31.5	20	16.5
	Total	345	360	318	327	318	172	316	295.5	193	127.5
	Mean	86.25	90	79.5	81.75	79.5	43	79	73.88	48.25	31.88

Experimental Condition	Subject	Heart Rate 1	2	3	4	5	Peripheral Pulse Volume 1	2	3	4	5
InEN External Males	1	117	120	120	111	108	32.5	31	21	26	18.5
	2	81	105	96	96	87	48.5	57.[illegible]	46	142.5	145
	3	117	108	99	102	102	40	25	19	26	15
	4	99	102	102	90	99	48.5	46	69.5	93	120
	5	96	99	90	90	84	51	78	139	138.5	150
	Total	510	534	507	489	480	220.5	237.4	294.5	426	451.[illegible]
	Mean	102	106.8	101.4	97.8	96	44.1	47.48	58.9	85.2	90.[illegible]
InEN External Females	1	72	78	78	78	69	40	49.5	24.5	11.5	7
	2	117	108	96	93	93	29	27	24.5	18.5	13
	3	72	75	75	69	75	52.5	123.5	70	51.5	38
	4	114	96	90	81	81	36	61.5	92.5	112.5	150
	5	75	84	87	90	84	47.5	75	95	96	90
	Total	450	441	426	411	402	205	336.5	306.5	290	298
	Mean	90	88.2	85.2	82.2	80.4	41	67.3	61.3	58	59.6
InEN External Males (Sep. Expt.)	1	117	111	102	99	96	58.5	77	46	27.5	32.5
	2										
	3	60	57	66	57	60	46.5	75	36	56	50
	4	84	78	69	69	66	57	73	82	74.5	65
	5	93	93	81	84	90	17.5	38	60	61	32.5
	Total	354	339	318	309	312	179.5	263	224	219	180
	Mean	88.5	84.75	79.5	77.25	78	44.88	65.75	56	54.75	45
InEN External Females (Sep. Expt.)	1										
	2	102	87	75	75	78	40.5	123	87	64.5	101
	3										
	4	93	96	93	90	90	54	62.5	48.5	16.5	24.5
	5	93	99	78	81	78	42.5	47.5	35	20	22
	Total	288	282	246	246	246	137	233	170.5	101	147.5
	Mean	96	94	82	82	82	45.67	77.67	56.83	33.67	49.17
Total EN (Externals)		837	811	795	795	786	315.5	308.5	267.5	301	396
Mean EN (Externals)		93	90.11	88.33	88.33	87.22	35.06	34.28	30.72	33.44	44
Total EN (Internals)		597	591	570	573	579	280.5	348.67	299	402	346.5
Mean EN (Internals)		85.29	84.43	81.43	81.86	82.71	40.07	49.81	42.71	57.43	49.35
Total InEN (Externals)		1602	1596	1497	1455	1440	742	1069.9	995.5	1036	1077
Mean InEN (Externals)		94.24	93.88	88.06	85.59	84.71	43.65	62.94	58.56	60.94	63.75
Total InEN (Internals)		792	801	735	735	720	335.5	503.5	430	291.5	211
Mean InEN (Internals)		88	89	81.67	81.67	80	37.28	55.94	47.78	32.39	23.44

KEY
EN Escapable Noise
InEN Inescapable Noise

Experimental Condition	Subject	Individual Anagram Latencies 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Mean Response Latency		Number of trials to criterion		Number of failures to solve	
InEN Internal Males	1	100	68	20	100	100	100	17	27	15	5	10	38	100	88	100	28	76	15	54	6	38.55		19		4	
	2	100	100	9	100	12	100	100	98	100	22	9	6	100	100	25	7	4	72	6	37	53.45		20		6	
	3	100	28	7	100	22	8	6	4	3	3	3	8	36	4	7	100	5	9	5	3	37		18		5	
	4	100	95	7	25	100	100	5	29	4	17	100	4	10	15	100	11	5	5	5	3	23.05		8		3	
	5	7	54	40	100	8	46	100	15	100	52	36	4	7	100	44	30	4	14	5	5	55.35	41.48	20	17	8	5.2
InEN Internal Females	1	100	21	26	32	7	34	15	4	11	84	5	5	18	95	10	100	5	22	5	4	30.15		20		2	
	2	100	100	62	100	22	44	7	100	15	7	8	5	100	100	100	100	7	100	7	100	40.1		15		5	
	3	17	12	15	24	7	5	99	4	20	66	5	3	42	100	100	100	12	80	7	4	36.1		20		3	
	4	50	35	45	100	30	7	100	100	100	100	4	70	5	7	10	20	4	6	4	5	7.6		7		0	
	5	46	5	8	15	9	2	7	5	4	2	2	2	14	4	6	4	3	6	3	5	59.2	34.63	12	14.8	10	4
InEN External Males	1	65	100	42	18	9	8	5	8	14	3	4	5	6	5	4	10	4	3	4	3	16		7		1	
	2	100	17	98	100	100	100	100	100	8	100	100	10	98	100	47	100	5	12	4	4	19.8		7		2	
	3	27	18	14	40	5	5	7	3	2	2	4	4	7	4	4	3	2	5	4	3	65.15		19		10	
	4	100	70	26	100	6	5	12	8	12	4	4	3	4	4	5	10	3	2	2	2	54.15		20		5	
	5	43	15	14	100	73	23	7	100	44	76	74	46	100	100	100	22	8	94	12	59	8.15	32.65	7	12	0	3.6
InEN External Females	1	100	100	38	45	17	8	100	25	100	7	4	10	100	100	70	100	5	4	4	3	47		12		7	
	2	6	100	20	19	12	8	4	5	100	100	5	11	14	54	7	100	9	31	9	45	32.95		7		4	
	3	32	5	7	100	86	10	17	8	15	98	100	7	52	100	7	40	7	22	11	7	85.35		20		16	
	4	100	35	22	37	14	100	100	80	66	7	3	22	6	7	10	71	7	6	8	2	35.15		15		3	
	5	7	100	100	100	47	100	100	100	100	100	100	100	100	100	100	100	18	100	35	100	36.55	47.4	20	14.8	3	6.6
Part B.	Separate Experiment Post Test Subjects																										
InEN External Males	1	100	30	16	100	43	14	100	92	17	100	11	100	100	100	17	91	69	7	2	90	59.95		20		7	
	2	100	52	39	34	5	5	12	3	5	2	2	11	3	2	3	2	2	3	2	3	42.2		20		5	
	3	100	14	6	29	4	5	10	6	6	3	3	4	9	100	22	19	5	3	5	3	14.5		7		1	
	4	43	25	30	100	3	3	74	9	17	61	4	100	100	100	6	100	4	49	3	13	35.65		10		4	
	5	100	35	43	48	43	30	30	4	6	3	15	7	100	100	10	19	5	100	2	13	17.8	34.02	7	12.8	2	3.8
InEN External Females	1	27	40	7	57	100	75	100	100	3	16	25	93	15	100	100	100	24	35	4	100	56.05		20		7	
	2	100	60	77	100	100	11	100	9	5	40	9	4	100	100	100	12	5	100	7	85	57.15		20		8	
	3	6	100	52	100	75	90	20	8	4	2	5	2	7	30	3	6	3	3	2	4	34.55		12		2	
	4	100	20	15	100	14	80	6	4	6	5	6	5	7	55	16	3	3	13	3	4	23		9		2	
	5	100	55	23	98	100	68	59	96	26	4	3	2	5	19	5	18	1	4	2	3	26.1	39.37	10	14.2	2	4.2

KEY
NNC No Noise Pretreatment Control
EN Escapable Noise
InEN Inescapable Noise

The overall mean for each experimental group (i.e. the mean of the total of the individual means) is given to right of the last individual entry in each cell.

TABLE 4.

Analysis of Variance of total mean response latencies, Trial block 2

Source	df	MS	F
Between Sex (A)	1	.114	.14
Between Locus of Control (B)	1	8.32	10.02*
A x B	1	.216	.26
Within Cell	16	.83	

*p <.01

TABLE 5.

Analysis of Variance of total mean response latencies, Trial block 3

Source	df	MS	F
Between Sex (A)	1	.01	.01
Between Locus of Control (B)	1	2.52	2.6
A x B	1	1.86	1.92
Within Cell	16		

TABLE 6.

Analysis of Variance of total mean response latencies, Trial block 4

Source	df	MS	F
Between Sex (A)	1	.23	.24
Between Locus of Control (B)	1	2.12	2.19
A x B	1	.6	.62
Within Cell	16	.97	

TABLE 7.

Analysis of Variance of total mean response latencies, Trial block 5

Source	df	MS	F
Between Sex (A)	1	.29	.23
Between Locus of Control (B)	1	1.05	.82
A x B	1	2.32	1.81
Within Cell	16	1.28	

TABLE 8.

Analysis of Variance of total mean response latencies, Trial block 10

Source	df	MS	F
Between Sex (A)	1	.58	4.14*
Between Locus of Control (B)	1	.89	6.36**
A x B	1	.06	.43
Within Cell	16	.14	

*$p < .10$
**$p < .05$

APPENDIX 8

POST TEST TASK PERFORMANCE: ANOVA SUMMARY TABLES.
(ANAGRAMS TASK)

TABLE 1. Analysis of Variance of mean response latencies

Source	df	MS	F
Locus of Control (A)	1	19.15	.15
Treatment (B)	2	1454.48	13.32*
Sex (C)	1	220.8	2.02
AB	2	38.9	.36
AC	1	1206.56	11.05**
BC	2	172.68	1.58
ABC	2	231.08	2.12
Within Cell	48	109.19	

*p <.001
**p <.005

TABLE 2. Analysis of Variance of failures to solve anagrams

Source	df	MS	F
Locus of Control (A)	1	.14	.05
Treatment (B)	2	34.72	11.42**
Sex (C)	1	12.14	3.99
AB	2	1.56	.51
AC	1	28.04	9.22**
BC	2	11.26	3.7
ABC	2	5.21	1.71
Within Cell	48	3.04	

**p <.005

TABLE 3. Analysis of Variance of number of trials to criterion

Source	df	MS	F
Locus of Control (A)	1	112.06	10.18**
Treatment (B)	2	131.12	11.91*
Sex (C)	1	.59	.05
AB	2	3.02	.27
AC	1	72.62	6.6***
BC	2	13.66	1.24
ABC	2	23.84	2.17
Within Cell	48	11.01	

* $p < .001$
** $p < .005$
*** $p < .05$

APPENDIX 9

POST TEST TASK PERFORMANCE: SIGNIFICANCE LEVELS ASSOCIATED WITH THE PLANNED CONTRASTS BETWEEN THE MEANS AND STANDARD DEVIATIONS OF THE INESCAPABLE NOISE EXTERNALS AND INESCAPABLE NOISE INTERNALS.

Contrast 1. Internal vs External Inescapable Males (same 'expt.'

Dependent Variable	Internal $\overline{M}$	SD	External $\overline{M}$	SD	t value*	p	F value**	p
MRL	41.48	11.87	32.0	22.63	.69	NS	3.64	NS
FTS	5.2	1.72	3.6	3.61	.80	NS	4.41	<.10
TTC	17.0	4.56	12.0	6.13	1.31	NS	1.81	NS

Contrast 2. Internal vs External Inescapable Females (Same 'expt.'

MRL	34.63	16.65	47.4	19.58	.99	NS	1.38	NS
FTS	4.0	3.4	6.6	4.9	.87	NS	2.09	NS
TTC	14.8	4.96	14.8	4.96	0	NS	0	NS

* Test of significance of the differences between the means. Two-tailed with 8 df.

** Test of Significance of the differences between the standard deviations. See Garret, 1955, pp 233-234. One-tailed with 4,4 df.

MRL Mean Response Latency
FTS Failures to Solve
TTC Trials to Criterion

APPENDIX 10.

INDIVIDUAL SUBJECTIVE STRESS SCORES BEFORE AND AFTER PRE-TREATMENT AS A FUNCTION OF SEX, LOCUS OF CONTROL, AND PRETREATMENT.

Experimental Condition	Subject	B	A	Experimental Condition	Subject	B	A
NNC Internal Males	1	62	60	NNC Internal Females	1	55	48
	2	43	48		2	54	61
	3	22	27		3	50	51
	4	27	37		4	38	36
	5	38	34		5	51	51
	Total	192	206		Total	248	247
EN Internal Males	1	42	46	EN Internal Females	1	51	54
	2	55	46		2	42	50
	3	28	41		3	45	46
	4	48	30		4	58	41
	5	42	56		5	38	53
	Total	215	219		Total	234	244
InEN Internal Males	1	27	26	InEN Internal Females	1	48	47
	2	40	76		2	57	62
	3	27	38		3	58	49
	4	42	48		4	52	56
	5	46	62		5	51	51
	Total	177	250		Total	266	265
NNC External Males	1	39	35	NNC External Females	1	43	42
	2	38	36		2	50	47
	3	37	39		3	29	29
	4	36	36		4	38	39
	5	45	46		5	36	32
	Total	195	192		Total	196	189
EN External Males	1	40	37	EN External Males	1	44	43
	2	39	40		2	39	48
	3	57	43		3	52	58
	4	50	38		4	49	49
	5	52	44		5	34	51
	Total	238	202		Total	218	254
InEN External Males	1	35	46	InEN External Females	1	43	65
	2	44	54		2	33	44
	3	58	65		3	44	64
	4	40	56		4	63	62
	5	58	64		5	40	58
	Total	235	285		Total	223	293
InEN External Males (Sep. Expt.)	1	51	53	InEN External Females (Sep.	1	52	61
	2	46	58		2	53	49
	3	39	47		3	48	50
	4	36	45		4	37	51
	5	37	36		5	68	73
	Total	209	239		Total	258	284

A= After Pretreatment. B= Before Pretreatment.

Physiological Recordings

Experimental Condition	Subject	Heart Rate 1	Heart Rate 2	Heart Rate 3	Heart Rate 4	Heart Rate 5	Peripheral Pulse Volume 1	Peripheral Pulse Volume 2	Peripheral Pulse Volume 3	Peripheral Pulse Volume 4	Peripheral Pulse Volume 5
EN Internal Males	1	72	63	63	60	63	46.5	57	51	49.5	58
	2	81	84	84	81	81	55.3	50	35	53	55
	3	96	102	90	87	84	33	15	16	19.5	17.5
	4	78	75	69	75	81	16	46	48	140	80.5
	5										
	Total	327	324	306	303	309	151	168	150	262	211
	Mean	81.75	81	76.5	75.75	77.25	37.75	42	30	65.5	52.75
EN Internal Females	1						34	61	40	19	6.5
	2	87	87	84	84	84	40.5	40.5	53.5	79	88
	3	90	84	84	90	90					
	4						55	79.5	55.5	42	41
	5	93	96	96	96	96					
	Total	270	267	264	270	270	129.5	180.67	149	140	135.5
	Mean	90	90	90	90	90	43.17	60.22	49.67	46.67	45.17
EN External Males	1	99	87	99	93	99	22.5	13	13	10	10
	2						25	14	15	6	7
	3	126	117	117	120	114	43	44.5	24	16.5	20.5
	4	84	87	90	90	81	25	21	40	62.5	130
	5	66	63	57	60	57					
	Total	375	352	363	363	351	118.5	92.5	92	95	167.5
	Mean	93.75	88.5	90.75	90.75	87.75	29.63	23.13	23	23.75	41.88
EN External Females	1	87	93	90	93	93	60.5	60.5	11	19	4
	2	96	93	93	93	93	35	45.5	67.5	127.5	150
	3	72	75	66	66	72	29.5	31.5	24.5	16.5	30
	4	117	114	108	105	102	43.5	25	42.5	26	27
	5	90	84	75	75	75	28.5	53.5	30	17.5	17.5
	Total	462	459	432	432	435	197	216	175.5	206.5	228.5
	Mean	92.4	91.8	86.4	86.4	87	39.4	43.2	35.1	41.3	45.7
InEN Internal Males	1	84	75	72	72	69	30	26	17	14.5	18
	2	108	111	90	90	84	14	13	8	7.5	7.5
	3	84	84	87	81	81	37.5	16.5	17	18.5	10.5
	4	87	84	84	78	84	36.5	50	44	32.5	31.5
	5	84	87	84	87	84	45.5	82	48.5	25.5	16
	Total	447	441	417	408	402	163.5	187.5	134.5	98.5	83.5
	Mean	89.4	88.2	83.4	81.6	80.4	32.7	37.5	26.9	19.7	16.7
InEN Internal Females	1	75	69	66	63	63	60.5	150	147	71	41
	2										
	3	84	84	78	75	72	47	77.5	47	49	19.5
	4	93	96	75	90	90	42	48.5	70	53	50.5
	5	93	111	99	99	93	22.5	40	31.5	20	16.5
	Total	345	360	318	327	318	172	316	295.5	193	127.5
	Mean	86.25	90	79.5	81.75	79.5	43	79	73.88	48.25	31.88
InEN External Males	1	117	120	120	111	108	32.5	31	21	26	18.5
	2	81	105	96	96	87	48.5	57.5	46	142.5	145
	3	117	108	99	102	102	40	25	19	26	19
	4	99	102	102	90	99	48.5	46	69.5	93	120
	5	96	99	90	90	84	51	78	139	138.5	150
	Total	510	534	507	489	480	220.5	237.4	294.5	426	451.5
	Mean	102	106.8	101.4	97.8	96	44.1	47.48	58.9	85.2	90.3
InEN External Females	1	72	78	78	78	69	40	49.5	24.5	11.5	7
	2	117	108	96	93	93	29	27	24.5	18.5	13
	3	72	75	75	69	75	52.5	123.5	70	51.5	38
	4	114	96	90	81	81	36	61.5	92.5	112.5	150
	5	75	84	87	90	84	47.5	75	95	96	90
	Total	450	441	426	411	402	205	336.5	306.5	290	298
	Mean	90	88.2	85.2	82.2	80.4	41	67.3	61.3	58	59.6
InEN External Males (Sep. Expt.)	1	117	111	102	99	96	58.5	77	46	27.5	32.5
	2										
	3	60	57	66	57	60	46.5	75	36	56	50
	4	84	78	69	69	66	57	73	82	74.5	65
	5	93	93	81	84	90	17.5	38	60	61	32.5
	Total	354	339	318	309	312	179.5	263	224	219	180
	Mean	88.5	84.75	79.5	77.25	78	44.88	65.75	56	54.75	45
InEN External Females (Sep. Expt.)	1										
	2	102	87	75	75	78	40.5	123	87	64.5	101
	3										
	4	93	96	93	90	90	54	62.5	48.5	16.5	24.5
	5	93	99	78	81	78	42.5	47.5	35	20	22
	Total	288	282	246	246	246	137	233	170.5	101	147.5
	Mean	96	94	82	82	82	45.67	77.67	56.83	33.67	49.17
Total EN (Externals)		837	811	795	795	786	315.5	308.5	267.5	301	396
Mean EN (Externals)		93	90.11	88.33	88.33	87.22	35.06	34.28	30.72	33.44	44
Total EN (Internals)		597	591	570	573	579	280.5	348.67	299	402	346.5
Mean EN (Internals)		85.29	84.43	81.43	81.86	82.71	40.07	49.81	42.71	57.43	49.36
Total InEN (Externals)		1602	1596	1497	1455	1440	742	1069.9	995.5	1036	1077
Mean InEN (Externals)		94.24	93.88	88.06	85.59	84.71	43.65	62.94	58.56	60.94	63.75
Total InEN (Internals)		792	801	735	735	720	335.5	503.5	430	291.5	211
Mean InEN (Internals)		88	89	81.67	81.67	80	37.28	55.94	47.78	32.39	23.44

KEY EN Escapable Noise
InEN Inescapable Noise

APPENDIX 12.

POST EXPERIMENTAL QUESTIONNAIRE RESULTS

Experimental Condition	Subject	Question* 1	2	3	4	5
EN Internal Males	1	7	3	7	7	3
	2	1	4	6	6	5
	3	7	7	7	7	7
	4	7	7	7	3	5
	5	1	2	6	6	2
	Total	23	23	32	29	22
EN Internal Females	1	7	2	7	7	7
	2	7	2	7	7	5
	3	6	4	6	7	6
	4	7	6	7	7	2
	5	7	7	4	7	7
	Total	34	21	31	35	27
EN External Males	1	7	4	7	7	6
	2	7	2	6	7	6
	3	6	5	3	7	7
	4	3	7	6	3	4
	5	6	6	6	7	6
	Total	29	24	28	31	29
EN External Females	1	7	6	6	4	6
	2	2	5	7	7	5
	3	7	3	2	1	6
	4	6	6	6	7	6
	5	5	3	7	7	2
	Total	27	23	28	26	25
InEN Internal Males	1	1	2	7	7	6
	2	1	3	1	4	1
	3	1	4	7	7	5
	4	2	7	4	4	6
	5	5	3	6	5	4
	Total	10	19	25	27	22
InEN Internal Females	1	2	6	7	7	2
	2	3	4	4	1	6
	3	3	6	7	7	7
	4	1	4	7	7	2
	5	2	4	7	6	3
	Total	11	24	32	28	20

(Continued on the following page)

* See Appendix 4 for the content of each question.

Appendix 12 continued

Experimental Condition	Subject	Question 1	2	3	4	5
InEN External Males	1	1	6	4	6	5
	2	1	6	6	7	6
	3	1	3	5	5	6
	4	2	2	3	5	1
	5	1	6	3	7	7
	Total	6	23	21	30	25
InEN External Females	1	1	1	2	7	3
	2	1	6	6	7	6
	3	1	2	4	1	1
	4	1	7	1	6	5
	5	1	4	3	7	5
	Total	5	20	16	28	20
InEN External Males (Sep. Expt.)	1	2	3	3	7	6
	2	1	6	6	6	4
	3	1	2	7	7	7
	4	2	5	7	7	2
	5	3	6	7	7	5
	Total	9	22	30	34	24
InEN External Females (Sep. Expt.)	1	1	6	4	3	3
	2	1	3	7	7	3
	3	1	2	3	3	5
	4	2	4	6	7	6
	5	1	2	1	7	7
	Total	6	17	21	27	24

APPENDIX 13.

POST EXPERIMENTAL QUESTIONNAIRE ANOVA SUMMARY TABLES.

TABLE 1. Question One Results

Source	df	MS	F
Locus of Control (A)	1	3.02	1.1
Treatment (B)	1	164.02	59.86*
Sex (C)	1	2.02	.74
AB	1	2.03	.74
AC	1	5.63	2.05
BC	1	2.03	.74
ABC	1	3.03	1.11
Within Cell	32	2.74	

*p<.001

TABLE 2. Question Two Results

Source	df	MS	F
A	1	.22	.06
B	1	.62	.16
C	1	.02	.01
AB	1	.23	.06
AC	1	1.23	.32
BC	1	.63	.17
ABC	1	2.02	.53
Within Cell	32	3.81	

TABLE 3. Question Three Results

Source	df	MS	F
A	1	18.22	5.71 *
B	1	15.62	3.45
C	1	.02	.01
AB	1	4.23	1.33
AC	1	3.03	.95
BC	1	.23	.07
ABC	1	4.22	1.32
Within Cell	32	3.19	

*p<.05

TABLE 4. Question Four Results

Source	df	MS	F
A	1	.4	.11
B	1	1.6	.47
C	1	0	0
AB	1	2.5	.67
AC	1	4.9	1.31
BC	1	.1	.03
ABC	1	1.9	.51
Within Cell	32	3.74	

TABLE 5. Question Five Results

Source	df	MS	F
A	1	1.6	.41
B	1	6.4	1.62
C	1	0.9	.23
AB	1	.1	.03
AC	1	3.6	.91
BC	1	1.6	.41
ABC	1	.9	.23
Within Cell	32	3.95	

APPENDIX 14. LOCUS OF CONTROL AND CONSERVATIVISM-RADICALISM.[1]

More than six weeks prior to the experimentation conducted in this thesis, Rotter's I-E Scale was administered to two Stage 1 Psychology lecture groups at the University of Canterbury. The overall summary descriptions of the data collected from these two groups were as follows:

Males M= 12.27, n= 97, SD= 4.1
Females M= 13.12, n= 92, SD= 4.2
Total M= 12.68, n= 189, SD= 4.15

An earlier study of a comparable group of NZ students (McGinnies, et. el.,1974), conducted between 1967-1970, found the following:

Males M= 9.75, n= 126, SD=5.35
Females M= 10.66,n= 93, SD=5.74

It would seem that there has been a moderate overall shift in the external direction within the NZ student population with the slight male-female difference remaining much the same. Rotter (1975) notes a similar shift in US student samples, from an initial mean score of around 8 (SD= 4) in the late 1950s to one of about 12 (SD= 4) in the early 1970s. As was mentioned in the locus of control review chapter of this thesis (Chapter 5), this shift appears to be associated with an increasing complexity of I-E factor structure, the differentiation being more marked in external subjects.

Because an external score indicates a belief in less control over events in one's environment, presumably, people in the 1970s (particularly students?) believe they have less control than they did in the 1950s and 1960s. This could be an interesting issue for Sociologists or

1. This is a preliminary report on a more detailed and continuing investigation.

Political Scientists to pursue. What social changes and processes have been involved with this attitude change? What are the wider implications for such a change?

Some of the items that score in the external direction appear to be ones that could be responded to in an external direction by people who have an increased awareness of the control by powerful others and the real complexity of economic and social processes in modern society. Such indivduals would not necessarily have external attitudes with respect to their own behaviour and events closer to themselves in terms of causation. As a preliminary investigation of this conceptualization, it was hypothesized that politically radical individuals should have less feelings of actual power over many social forces. Consequently, they should score in an external direction. To test this proposal, a third Stage 1 lecture group was administered the I-E Scale followed by the Wilson-Patterson Conservatism Scale (Wilson,G.,& Patterson,J.M.,1970).

The results obtained were:

I-E Scale.	Male	M= 11.55,	n=53,	SD= 4.23
	Female	M=12.2,	n=55,	SD= 3.36
W-P Conservatism.	Male	M=36.4,	"	SD= 11.71
	Female	M=36.6,	"	SD= 14.12

A Pearson Product Moment Correlation coefficient of -.205 was obtained using the distributions of the two measures. This relationship was significant ($p<.05$) and in the predicted direction - i.e.,externality is associated with a tendency to be politically radical. However, this relationship accounts for only a negligible part of the overall variance ($SD^2=.04$), leaving 96% unexplained. Dr H.Priest of this University is conducting factor analyses on the data from the first two samples. It is expected that one or more factors might be extracted that correlate more highly with radicalism on the W-P Scale.